

C O N F I D E N T I A L

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1 STATE OF MINNESOTA DISTRICT COURT

2 COUNTY OF RAMSEY SECOND JUDICIAL DISTRICT

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4 The State of Minnesota,

5 by Hubert H. Humphrey, III,

6 its attorney general,

7 and

8 Blue Cross and Blue Shield

9 of Minnesota,

10 Plaintiffs,

11 vs. File No. C1-94-8565

12 Philip Morris Incorporated, R.J.

13 Reynolds Tobacco Company, Brown &

14 Williamson Tobacco Corporation,

15 B.A.T. Industries P.L.C., Lorillard

16 Tobacco Company, The American

17 Tobacco Company, Liggett Group, Inc.,

18 The Council for Tobacco Research-U.S.A.,

19 Inc., and The Tobacco Institute, Inc.,

20 Defendants.

21 - - - - -

22

23 DEPOSITION OF DAVID TOWNSEND

24 Volume I, Pages 1 - 348

25

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1 (The following is the deposition of DAVID
2 TOWNSEND, taken pursuant to Notice of Taking
3 Deposition, by videotape, at the offices of Dorsey &
4 Whitney, Attorneys at Law, Pillsbury Center South,
5 220 South Sixth Street, Minneapolis, Minnesota, on
6 October 1, 1997, commencing at approximately 8:37
7 o'clock a.m.)

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12

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1 I N D E X

2	EXHIBITS	DESCRIPTION	PAGE MARKED
3	Townsend 4805	Expert Report of David Townsend, Ph.D., June 30,	
5		1997	5
6	4806	Research publications	27
7	4807	Handwritten equations,	
8		1 page	318
9	4808	Handwritten equations,	
10		1 page	319
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1 PROCEEDINGS

2 (Plaintiffs' Exhibit 4805 was marked
3 for identification.)

4 DAVID TOWNSEND

5 called as a witness, being first duly
6 sworn, was examined and testified
7 as follows:

8 EXAMINATION

9 BY MR. O'FALLON:

10 Q. Dr. Townsend, my name is Dan O'Fallon. I'm a --
11 an attorney for the State of Minnesota and Blue
12 Cross, Blue Shield in litigation entitled the State
13 of Minnesota and Blue Cross, Blue Shield versus R.J.
14 Reynolds Tobacco Company and other tobacco
15 companies. You're familiar with that litigation?

16 A. I'm aware of that litigation.

17 Q. And you've actually given an expert report in
18 that litigation; is that correct?

19 A. That's correct.

20 Q. And you've been identified by R.J. Reynolds as
21 an expert; correct?

22 A. As an expert in the area of cigarette design.

23 Q. And presumably you're prepared to testify on any
24 of the issues contained in your expert report;
25 correct?

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1 A. Yes, I am.

2 Q. I'd like to hand you what's been previously
3 marked as Plaintiffs' Exhibit 4805. Could you please
4 identify that for me.

5 A. This is the expert report, my expert report,
6 with attachments.

7 Q. Is that the entirety of your expert report,
8 sir?

9 A. Well without going page by page, I believe it
10 is.

11 Q. Now it's my understanding that you didn't start
12 at R.J. Reynolds until 1977. Correct?

13 A. I accepted a position at R.J. Reynolds in
14 October of 1977.

15 Q. And it's my understanding that certain parts of
16 your report relate to time periods before 1977.

17 Correct?

18 A. Sure.

19 Q. How did you arrive at those conclusions based on
20 events that happened before you started at R.J.
21 Reynolds?

22 MR. PLESEC: Object to the form of the
23 question.

24 A. There's -- there's two major ways that I've
25 become familiar with what's happened before I began

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1 working for R.J. Reynolds. The first is through
2 reviewing research reports and documents in the R&D
3 library, and the second major way is by talking to
4 people who had been there longer, talking to
5 scientists about their work, about work of others.
6 And then I suppose there's a third, and that's by
7 reviewing the -- the external literature as well.

8 Q. So part of your opinions that you've expressed
9 in your report, which is marked as Plaintiffs'
10 Exhibit 4805, are based upon your review of internal
11 R.J. Reynolds documents; correct?

12 MR. PLESEC: Objection.

13 A. Part of -- part of my expert report includes my
14 understanding of R.J. Reynolds' research and
15 development efforts that predate my employment based
16 on review of internal documents.

17 Q. Okay. I don't see a listing of those documents
18 in the report. Could you please point that out for
19 me where that listing is.

20 A. Well I think it's impossible to provide a
21 complete listing of everything that I've ever read
22 that lead me to my -- to my opinions.

23 Q. I'm sorry, I -- again I don't see a listing
24 anywhere in your expert report of the RJR documents
25 you've relied on. Could you point that out to me.

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1 MR. PLESEC: Objection, argumentative.

2 A. There is no series of documents that concisely
3 summarize the information that I've developed over 20
4 years of working with Reynolds.

5 Q. But presumably you base your opinions on the
6 review of documents, as I believe you've already
7 testified; correct?

8 A. And I believe I've already testified that it's a
9 huge number of documents. I could -- I couldn't
10 possibly begin to list all the documents that I've
11 read over a 20-year period that's led me to my expert
12 opinions.

13 Q. But you could at least list the key documents;
14 isn't that correct?

15 MR. PLESEC: Objection.

16 A. I don't think it's fair to even suggest that
17 there's key documents. I think there's a bulk of
18 literature both internal and external that leads any
19 scientist, including me, to their expert opinions.

20 Q. Well, sir, are you familiar with the court
21 orders in this court that require you to list the
22 documents you've relied upon in your expert report?

23 Are you familiar with that?

24 A. I'm not a lawyer.

25 MR. PLESEC: Objection.

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1 A. I'm not very familiar with -- with any of that.

2 Q. And no lawyer has ever asked you to give them a
3 list of the internal R.J. Reynolds documents upon
4 which you base your opinions as stated in the report
5 you have before you, Plaintiffs' Exhibit 4805; is
6 that correct?

7 MR. PLESEC: Objection.

8 A. We've discussed this issue. My conclusion is,
9 as I said before, that there's such a tremendous
10 number of documents, there's no one concise list of
11 documents that's led me to my opinions. It's a --
12 it's reading many, many documents over a long period
13 of time, 20 years.

14 Q. So presumably you won't be discussing any
15 documents at the trial of this matter; is that
16 correct?

17 MR. PLESEC: Objection.

18 A. I don't think that's fair.

19 Q. Well then what documents do you plan to discuss,
20 sir, because I think I'm entitled to know what
21 documents those are so I can conduct this
22 cross-examination of your expert report?

23 MR. PLESEC: Objection.

24 A. I'm not entirely sure which documents will be
25 used. I think the expert report, as it's written,

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1 fairly summarizes at least what I expect to -- to
2 testify to in -- in -- in any trial, including this
3 one in Minnesota. I think that testimony has --
4 has -- has certainly been out there because I've
5 testified to similar matters in other litigation.

6 Q. But it certainly doesn't give me any idea of
7 what documents, what internal RJR documents, you're
8 relying on in order to form your opinions, does it,
9 sir?

10 A. I'm telling you it's my opinion that it would be
11 impossible to develop a concise list of documents
12 that has led me over 20 years to the various
13 scientific opinions that I may testify to. The
14 wealth of information is huge.

15 Q. Is it your testimony that you could not do any
16 kind of list? You couldn't even give me a partial
17 list of the documents that you plan to testify about
18 in this trial?

19 MR. PLESEC: Objection.

20 A. The subjects that we're talking about are quite
21 broad. There's quite a lot of information, both
22 internal and external to Reynolds. I think any
23 partial list certainly would not include information
24 that would be testified to.

25 I don't see any way possible to develop such a

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1 list that concisely points to how I've developed my
2 opinions over such a long period of time.

3 Q. Have you had access to documents that R.J.
4 Reynolds has claimed are privileged in this case?

5 MR. PLESEC: Objection.

6 A. Are you talking about attorney-client
7 privilege?

8 Q. That's right.

9 A. I'm not aware of that.

10 Q. Are you aware of whether there's a group of
11 documents that RJR has segregated out that they claim
12 privileged and that you've been prohibited from
13 seeing?

14 MR. PLESEC: Objection.

15 A. Let me tell you what I am aware of. I'm aware
16 that certain attorney-client privileged documents are
17 the -- are the -- the focus of some legal debate.
18 I'm not a lawyer. I don't know the details, and I
19 don't recall seeing any of these documents.

20 Q. Can you testify with any certainty that you've
21 not seen a document that's been claimed as privileged
22 in this litigation, sir?

23 A. No.

24 MR. PLESEC: Objection.

25 A. I can't testify with certainty. I said, you

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1 know, I'm just not aware of any.

2 Q. Are there any documents that are sitting and
3 available in your research and development department
4 that have been claimed as privileged in this
5 litigation to the best of your knowledge?

6 A. I don't know.

7 Q. So you may have seen documents that are
8 privileged and you may in fact be basing expert
9 opinions here that you're going to talk about today
10 on privileged documents; isn't that true?

11 MR. PLESEC: Objection. You're arguing
12 with the witness now.

13 A. Look, I think I've made it very clear what
14 the -- what the situation is. I reviewed internal
15 documents. I'm not aware of reviewing any
16 attorney-client privileged documents that are the
17 subject of this case. I'm not a lawyer. I haven't
18 been involved in these issues. I'm a scientist, and
19 I'm here to try to answer your questions from a
20 scientific perspective.

21 Q. Okay. Well, sir, one of the things I'm entitled
22 to inquire about is the basis of your opinion, and
23 I'm certainly entitled to know whether or not you're
24 basing any of your opinions on the review of
25 privileged documents. As I understand it, you can't

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1 tell me whether or not you are in fact basing your
2 opinions on the review of privileged documents; is
3 that true?

4 MR. PLESEC: Objection, asked and answered
5 repeatedly.

6 A. That's not the subject of what I said. What
7 I -- what I just said, I believe, was that I'm not
8 aware that I've read any attorney-client privileged
9 documents. The basis of my expert testimony here
10 today or in any trial is based on scientific
11 information. I'm not aware that attorney-client
12 privileged documents factor into that at all.

13 Q. In any event, you would agree that it would be
14 inappropriate to claim as attorney-client privilege
15 solely scientific documents; correct?

16 MR. PLESEC: Objection.

17 A. Can you rephrase that. I don't understand your
18 question.

19 Q. What don't you understand about it?

20 A. Well please ask it again.

21 Q. In any event, you would agree that it would be
22 inappropriate to claim an attorney-client privilege
23 on solely scientific documents; correct?

24 MR. PLESEC: Objection. This is way
25 outside the scope of this man's knowledge and

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1 expertise. Let's get down to the --

2 MR. O'FALLON: Counsel, --

3 MR. PLESEC: -- the issue of the -- of the
4 deposition. He's here --

5 MR. O'FALLON: -- if you want to state an
6 objection, you state an objection. That's what the
7 court orders require in this case, and I'm entitled
8 to look into the basis of opinions, and that's what
9 I'm doing.

10 MR. PLESEC: I understand you --

11 MR. O'FALLON: Now if you have another
12 valid objection, you can state it. You can state the
13 word "objection," and then I'm going to ask my
14 question.

15 Would you like to state the word "objection" and
16 a concise legal basis for your objection?

17 MR. PLESEC: Counsel, I understand the
18 court's order, and the court's order does not allow
19 you to harass the witness. And that's exactly what
20 you're doing right now. I'm sure that Judge
21 Fitzpatrick would not tolerate this.

22 He -- this witness is here to answer questions
23 regarding his expertise. He's a scientist, not a
24 lawyer, not a -- not a corporate representative of --
25 of R.J. Reynolds Tobacco Company in any executive

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1 capacity other than as a scientist.

2 MR. O'FALLON: He's an executive, sir.

3 MR. PLESEC: Ask him questions about his
4 expertise, please.

5 MR. O'FALLON: Listen, I'll tell you what.

6 I'll ask the questions I need to. If you have an
7 objection, you state your objection, and then we'll
8 get along a lot better. Okay? The fact of the
9 matter is, Counsel, the court order in this case
10 requires you to give me a list of the documents on
11 which this person relies. You failed to do that.
12 I'm going to take the approach at trial that he is
13 not entitled to testify to any document which he
14 hasn't identified in this expert report.

15 Now you've apparently chosen to make that
16 decision, and now I'm going to ask him since he
17 hasn't provided me a list of any documents that he's
18 relied on and yet he's testified clearly that he's
19 relied on documents, internal R.J. Reynolds
20 documents, whether or not part of what he's relied
21 upon is privileged documents, because I think that
22 will have a great deal of impact on whether or not we
23 are then entitled to see those privileged documents
24 that you've claimed privileged.

25 I think that's absolutely valid

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1 cross-examination. If this gentleman is going to
2 express an expert opinion based on documents I'm not
3 entitled to see, that's simply unfair. I think even
4 you would agree to that.

5 MR. PLESEC: Counsel, I think the record is
6 clear on Dr. Townsend's position. Why don't you just
7 get on with your examination of him as an expert.

8 BY MR. O'FALLON:

9 Q. Again I just want to make it crystal clear
10 because I don't think you've yet answered my
11 question. You don't know whether or not you've in
12 fact looked at privileged documents; correct? You
13 may have; you may not have?

14 A. Let me --

15 MR. PLESEC: Objection.

16 A. Let me try to say this very clearly and very
17 concisely so we can move on.

18 Q. Answer my question.

19 A. I'm trying to. Okay? I'm not aware, I don't
20 remember reviewing any attorney-client privileged
21 documents for the purpose of this expert testimony or
22 for this particular trial. Obviously over a 20-year
23 period I've seen attorney-client privileged
24 documents, but they don't necessarily speak to
25 this -- this testimony or to this litigation.

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1 Q. And you can't necessarily exclude the fact that
2 you may in some part of your opinion rely on
3 documents that may now be being claimed by your
4 employer as privileged; correct?

5 A. I just don't know --

6 MR. PLESEC: Objection.

7 A. -- one way or the other. Don't you understand?

8 Q. Yes. That's the answer I've been asking, trying
9 to get from you the entire time. You don't know one
10 way or the other.

11 What did you do today in preparation for this
12 deposition?

13 A. Ate breakfast.

14 Q. What did you do previous to this deposition in
15 preparation for this deposition?

16 MR. PLESEC: Objection.

17 A. I've had two sessions with my counsel.

18 Q. Who were your counsel?

19 A. Bill Plesec from Jones Day.

20 Q. Anybody else?

21 A. Jim --

22 MR. SIMONSON: Simonson.

23 A. -- Simonson, local counsel; and Mike Martis from
24 Jones Day.

25 Q. Have you reviewed any documents in preparation

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1 for your deposition?

2 A. I've reviewed several.

3 Q. What documents have you reviewed?

4 A. I've briefly skimmed some of the documents that
5 has been named -- well again I'm not a lawyer, so I
6 don't understand how to articulate this, but they're
7 documents that have been named by the State of
8 Minnesota for my deposition. I didn't review all of
9 them, only some of them.

10 Q. Anything other than those documents?

11 A. I don't believe so.

12 Q. How many sessions did you have?

13 A. Two sessions.

14 Q. How long did those sessions last?

15 A. One session lasted approximately seven hours.

16 Another session lasted approximately maybe six
17 hours.

18 Q. Was any portion of those sessions videotaped?

19 A. No.

20 Q. You've given numerous depositions and also
21 testified at trial previously; correct?

22 A. I've testified now at four trials and I've given
23 a number of depositions.

24 Q. What trials have you testified at?

25 A. The first trial I testified in was Kueper in

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1 Illinois in 1993. I testified in Rogers in Ind --
2 Indiana in 1996; Connor in Florida, 1997; and Broin
3 in Florida, 1997.

4 Q. When did you testify in Broin?

5 A. Monday.

6 Q. Did you use any documents when you testified
7 down in Broin?

8 A. Used a large number of exhibits, some of which
9 were based on information in documents.

10 Q. Do you recall what documents that you relied
11 upon to give that trial testimony?

12 A. A large number of documents, including internal
13 R.J. Reynolds research and development reports, for
14 example, summarizing cigarette design characteristics
15 over a period of time, summarizing cigarette
16 performance characteristics over a period of time.

17 There was a huge number of documents.

18 Q. Were any specific documents shown to you during
19 the trial other than exhibits that were prepared from
20 documents? Were any internal R.J. Reynolds documents
21 shown to you during that trial by your counsel?

22 A. In preparation for the trial?

23 Q. At the trial.

24 A. No, I don't believe so.

25 Q. Have you ever underwent a process whereby your

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1 testimony has been videotaped and you've been
2 critiqued in preparation for any of your depositions
3 or your trial testimony?

4 MR. PLESEC: Objection.

5 A. Are you asking have I been trained for
6 litigation through videotaping --

7 Q. Yes.

8 A. -- and critique? The answer is no.

9 Q. You've never went, for instance, to New York and
10 met with any public relations people to teach you how
11 to present yourself, how to look on video, how to
12 look before a jury?

13 MR. PLESEC: Objection.

14 A. I've had media training on two different
15 occasions, not for the purpose of litigation. The
16 media training I received was years before I ever was
17 involved in litigation.

18 Q. Where did you have that media training?

19 A. One session, as I recall, was in New York with a
20 consultant. The second session was in Winston-Salem,
21 North Carolina, with that same consultant.

22 Q. What's the name of the consultant?

23 A. Virgil Scutter.

24 Q. Is he with some kind of a firm?

25 A. He's a consultant.

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1 MR. PLESEC: Objection.

2 Q. He's independent?

3 A. As far as I know, he's an independent
4 consultant.

5 Q. Were any attorneys present during your training
6 sessions with Mr. Scutter?

7 A. It's hard for me to remember that far back. I
8 really don't recall.

9 Q. What exactly was it that Mr. Scutter told you?
10 What did he do with you?

11 MR. PLESEC: Objection.

12 A. I can give you the essence of what we did. I
13 don't remember everything that he told me or all that
14 we did quite frankly.

15 The purpose of that training was to prepare me
16 for media contact on the issue of cigarette fire
17 safety. It focused on that. We role-played. We
18 included videotape interviews, came back and
19 critiqued those interviews, and all of that was again
20 for the purpose of direct contact with the media as a
21 scientist on that particular issue.

22 Q. Were there any basic rules he gave you about
23 media presentation?

24 A. Gee, I just really can't remember.

25 Q. Well why don't you tell me what you do remember

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1 about any basic rules he gave you about media
2 presentation.

3 MR. PLESEC: Objection. He just said he
4 doesn't remember.

5 A. I can't remember the details of what we did. I
6 can't remember the details of what he said. All I
7 remember is we focused on that one issue. We went
8 through some -- some mock questions and answers,
9 playing as if he were a reporter. We did videotape
10 some of that, which we then came back and critiqued.

11 I can't remember details about what was said and
12 what was the suggestions from this consultant.

13 Q. Do you remember any just general rules that
14 you're supposed to use when you make presentations,
15 anything of that sort? I mean, certainly you must
16 remember something of the -- of -- of the substance
17 as opposed to the procedure of the meetings.

18 MR. PLESEC: Objection, asked and answered,
19 argumentative.

20 A. The only thing in a very general sense that I
21 can remember is that it's very difficult for
22 scientists sometimes to develop their -- their
23 thoughts into small, concise, easily understandable
24 phrases, and I think he understood that that's a
25 difficult thing for many scientists to do and -- and

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1 I'm sure we worked on that.

2 That was one of the things that -- that I
3 suppose in a general sense I learned from that
4 session, was to be very careful in articulating
5 scientific information in a way that nonscientists
6 can understand.

7 Q. Did he also teach you to basically phrase your
8 answers in ways that they would give concise sound
9 bites?

10 MR. PLESEC: Objection.

11 A. There was discussion about sound bites. Frankly
12 I have a hard time doing that, as you may be aware.
13 I remember discussion about it. That's all.

14 Q. Did he talk about using easy-to-understand
15 phrases such as "silver bullet"?

16 A. No, I can't remember that term being used at
17 all.

18 Q. But that concept that sometimes what you have to
19 do is come up with easy, understandable phrases in
20 order to be able to persuasively get across your
21 point, was that a general theme of the media
22 training?

23 MR. PLESEC: Objection.

24 A. The general theme of the media training, as I
25 recall -- and again this is very general; it's been a

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1 long time ago -- was that there's a very limited
2 amount of time that a -- that a newspaper reporter or
3 a television reporter is going to give you; get your
4 message into a fairly short time frame so that they
5 can use it and make it understandable so that a
6 nonscientist can understand it. That's all I
7 remember.

8 Q. So in other words, you need to learn to
9 capsulize your message; correct?

10 MR. PLESEC: Objection.

11 A. I think that's one way of phrasing it.

12 Q. Other than these two meetings with Mr. Scutter,
13 that's the only media training you've had?

14 A. That's correct.

15 Q. And that's the only time you've ever had --
16 you've ever been videotaped for purposes of
17 evaluating or critiquing how you're presenting
18 information?

19 MR. PLESEC: Objection.

20 A. No, that's not -- that's not true.

21 Q. Okay.

22 A. Those are the only two sessions of media
23 training I've ever had.

24 Q. Okay. Why don't you tell me about the sessions
25 where you had what you were saying videotaped for

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1 purposes of critiquing how you were presenting
2 information.

3 A. There was another time when I attended a course
4 at the Center for Creative Leadership in Greensboro,
5 North Carolina. The subject of it was -- well
6 actually I attended two courses there. Was one the
7 Leadership Development Program. As I recall, there
8 was some videotape and critique of -- of me at that.

9 The second course was on communication skills,
10 and there was some videotaping and critique there.

11 Q. Okay.

12 A. The purpose of those were not media training.
13 The purpose of those were not litigation. They were
14 self-development.

15 Q. Okay. To the best of your recollection, is
16 there any other time when you've undergone sessions
17 where you've been videotaped for purposes of then
18 critiquing how you're presenting information?

19 A. I can't remember any other cases.

20 Q. In preparation for today's deposition, have you
21 spoken with any RJR personnel or former personnel?

22 A. To prepare for today?

23 Q. Yes.

24 A. The only conversation I can -- can remember
25 is -- is a short discussion with one of our internal

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1 counsel, and it was more of the mechanics of this,
2 when the deposition was scheduled, how long is it --
3 it was expected to go, the fact that I would have to
4 come to Minnesota. That was -- that's the discussion
5 I can remember.

6 Q. Have you had any discussions with RJR scientists
7 or former scientists concerning the subject matters
8 of today's testimony?

9 MR. PLESEC: Objection.

10 A. I can't recall any such discussions.

11 Q. Have you reviewed any deposition transcripts?

12 A. For the purpose of this trial or for the purpose
13 of this deposition?

14 Q. Well have you reviewed any deposition
15 transcripts from this litigation, from the Minnesota
16 litigation?

17 A. No.

18 Q. Have we now covered everything you did in
19 preparation for this deposition?

20 MR. PLESEC: Objection.

21 A. As far as I can remember. I had two sessions.
22 That's what we've -- that's what we've talked about.

23 Q. Let's go back to your report. I'd like you to
24 take a look at your resume quickly.

25 Is this resume complete and up to date as of

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1 today?

2 A. I believe it's complete, yes.

3 Q. Okay. Are there any additions that you need to
4 make to any of your research publications? Have you
5 had anything recently published?

6 A. I don't believe there's any peer reviewed
7 publications that need to be added here.

8 Q. Are all of the publications listed here peer
9 reviewed publications?

10 A. Well obviously the patents aren't. There's an
11 invited paper; of course that wasn't peer reviewed.
12 The rest are.

13 Q. Okay. But no recent patents, no other
14 information?

15 A. No.

16 MR. O'FALLON: Why don't we have this
17 marked real quickly.

18 (Plaintiffs' Exhibit 4806 was marked
19 for identification.)

20 BY MR. O'FALLON:

21 Q. Plaintiffs' 4806 are documents that have been
22 provided by counsel today, and I understand these are
23 all of your publications; is that correct? And if
24 not, would you just mark on your resume any
25 publications that are not provided.

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1 A. I believe that this is a full list. I will go
2 back and double-check, though, because I asked my
3 secretary at the last minute to get these out of my
4 file.

5 Q. Sure.

6 (Witness reviews exhibits.)

7 A. I'm going to go back through them. There's
8 several duplicates, and we are missing a couple.

9 Q. Okay. Why don't you go ahead and just tell me
10 what ones we're missing.

11 A. I believe we're missing number three. We're
12 missing number 9, 10 and 11, number 14 and number
13 20.

14 Q. Okay. And you've left those unmarked --

15 A. And then we've got -- I'm sorry.

16 Q. And you've left those unmarked on Plaintiffs'
17 Exhibit -- what is it?

18 A. I've left those unmarked. Well actually it's a
19 mixture. I need to -- let me circle the ones I
20 believe I'm missing here.

21 Q. Okay.

22 A. And then again, as I said, there's several
23 duplicates in this stack also.

24 Q. Do you believe those other documents that are
25 missing -- that's 3, 9, 10, 11, 14 and 20 -- are

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1 available?

2 A. I believe so. Number 14 is the only one that --
3 that I'm wondering about because that was an invited
4 paper, and I think I can get my hands on the
5 manuscript for it. It was essentially a discussion
6 of cigarette design and how cigarettes work.

7 Q. Okay.

8 A. I believe I have a manuscript. I just am not
9 sure where I'm going to look for it.

10 Q. Okay. I would appreciate if every effort's made
11 to get those documents before the end --

12 A. Okay.

13 Q. -- of the deposition.

14 A. Before the end of today's deposition?

15 Q. We're going to be going a couple days.

16 A. Okay.

17 Q. Turning back to your resume, you set out in your
18 resume your professional experience and you set forth
19 your history with R.J. Reynolds; correct?

20 A. That's right, correct. What it does is reflects
21 the different levels and just a very general
22 statement of my responsibility.

23 Q. Can you recall any specific projects at R.J.
24 Reynolds you've worked on or been responsible for?

25 A. Specific projects?

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1 Q. Yes.

2 A. Well sure.

3 Q. Why don't you just give me a list of what you
4 can recall.

5 A. I've been responsible for EW cigarette
6 development. I've been responsible for low-CO
7 cigarette development, a number of different attempts
8 at selective filtration via filter additives, been
9 responsible for a basic pro -- basic research program
10 on smoke formation mechanisms. I've been involved in
11 a number of different projects dealing with air
12 dilution and filtration and interactive effects of
13 those two variables.

14 I've had responsibility for low-sidestream
15 cigarette product development, for Russell cigarette
16 product development.

17 Q. What's that?

18 A. Russell cigarette is a medium-nicotine/low-tar
19 product.

20 Q. Is there any other name for that project?

21 A. There has been in the past.

22 Q. What are those other names?

23 A. Russell cigarette development is the current
24 name.

25 Q. What were the previous names?

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1 A. GT, XGT, XB. They were different in -- in some
2 respects, but same general thrust.

3 Q. And go on. Anything else you can recall?

4 A. I've been involved peripherally with Premier and
5 Eclipse development. Just it's a huge number. I
6 mean, those are some of the ones that come to mind
7 because some of them are more recent.

8 Q. Okay. What is the EW cigarette development?

9 A. "EW," first of all, doesn't really stand for
10 anything. It's just an internal code, but it's
11 essentially a product developed with the objective of
12 maximum reduction in as many controversial compounds
13 as possible in a tobacco burning product.

14 Q. Is that the precursor of Eclipse?

15 A. No. Eclipse is primarily a tobacco heating
16 product.

17 Q. Okay. Has EW resulted in any commercial
18 products?

19 A. We've had one version of EW in test market in
20 the U.S.

21 Q. And what's that called?

22 A. Well it was test marketed as Winston Select, but
23 only in that specific location.

24 Q. And where was it test marketed?

25 A. State of Oklahoma.

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1 Q. When was that done?

2 A. Test market began in mid to late 1995.

3 Q. Was that unsuccessful?

4 MR. PLESEC: Objection.

5 A. I think the degree of success is somewhat
6 proprietary. I would summarize it as that product
7 achieved reasonable consumer acceptance in -- in that
8 test market.

9 Q. But that product has not been commercialized on
10 a broader basis?

11 MR. PLESEC: Objection.

12 A. It has not yet been commercialized on a broader
13 basis. That's why this discussion is proprietary.

14 Q. How were you able to effect the reduction?

15 A. Mainly through two major design techniques, and
16 the combination of those two achieved major
17 reductions in a number of mainstream smoke
18 constituents. The two tools were primarily the use
19 of a -- of a new carbon paper folded filter -- folded
20 carbon paper, rather, which was able to effect a
21 major reduction in some volatile condensable
22 gas-phase constituents while maintaining consumer
23 acceptability, unlike other carbon filters.

24 The second major tool was a proprietary
25 low-nitrogen blend, which also was a low-nitrate

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1 blend.

2 Q. Specifically are the components you're trying to
3 reduce there nitrosamines?

4 A. That was one of the targets.

5 Q. What else did you reduce?

6 A. There were others. We had reductions,
7 significant reductions, in nitrosamines,
8 tobacco-specific nitrosamines, a series of carbonyl
9 compounds or aldehydes. We also had major reduction
10 in nitric oxide, a gas-phase free-radical compound.
11 We had major reductions in benzene, vinyl chloride, a
12 major reduction in cadmium, a major reduction in
13 hydrogen cyanide and others.

14 There were also major reductions in a number of
15 gross measures, including profile, gas chromatography
16 profiling. We saw major reductions in a variety of
17 peaks that we didn't -- that we don't have methods to
18 quantitate. We saw major reductions in gas-phase
19 free radicals, and we saw significant reductions in a
20 number of biological tests.

21 Q. What biological tests did you run?

22 A. Well we ran four that showed some difference.
23 One was Ames mutagenicity. Another was sister
24 chromatid exchange. Another was neutral red
25 cytotoxicity, and a fourth was the Alaric irritation

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1 animal test.

2 Q. Okay. Did you also run biological tests which
3 showed no difference?

4 A. We did.

5 Q. What are those biological tests?

6 A. We ran two. We showed -- we did 90-day
7 inhalation studies with -- with animals, and we did a
8 mouse skin painting study. Neither of those tests
9 showed significant differences in their endpoints.

10 Q. So there was no reduction on inhalation toxicity
11 or mouse skin painting tumorigenicity?

12 MR. PLESEC: Objection.

13 A. There was no difference in mouse skin painting
14 tumorigenicity. There was no difference in 90-day
15 inhalation, which is a measure of cellular changes on
16 inhalation.

17 Q. So the smoke from this cigarette, the EW
18 project, was still producing the same amount of
19 cellular change on in -- upon inhalation?

20 MR. PLESEC: Objection.

21 A. We saw no differences in either of those two
22 assays. We did see differences in the other four.

23 Q. What findings did you find upon the inhalation
24 testing? What were your findings?

25 A. Statistically no -- no significant difference

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1 between the EW product and an equal tar control
2 commercial product --

3 Q. What were the --

4 A. -- in tumorigenicity.

5 Q. What were --

6 In tumorigenicity?

7 A. In the number of tumors per animal.

8 Q. Upon inhalation?

9 A. No, no. You said mouse skin painting.

10 Q. No, I didn't. I said "inhalation."

11 A. Okay. Well my mistake. I'm sorry.

12 Q. Okay. What changes did you see upon
13 inhalation?

14 A. I'm not a biologist. My interpretation or
15 understanding is that the cellular changes on
16 inhalation with those animals was not significantly
17 different comparing EW product verse -- versus a
18 commercial product at the same -- same tar level.

19 Q. But what were the cellular changes?

20 MR. PLESEC: Objection.

21 A. I'm not a biologist. You'll have to ask --

22 Q. Well what's --

23 A. -- that person.

24 Q. -- your recollection of the cellular changes? I
25 assume you read the report.

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1 MR. PLESEC: Objection.

2 A. All I know is that there were cellular changes
3 on inhalation in a 90-day study in the respiratory
4 tract of certain animals.

5 Q. And what are those cellular changes? Do you
6 recall any of the terms for the cellular changes?

7 A. I --

8 MR. PLESEC: Objection.

9 A. I don't know.

10 Q. Do you know whether any of the cellular changes
11 that were observed are consistent with emphysema?

12 MR. PLESEC: Objection.

13 A. I'm not a biologist. I have no idea.

14 Q. Well I'm asking you for your understanding and
15 recollection having reviewed the reports.

16 A. I'm telling you I have no idea.

17 Q. You don't remember?

18 MR. PLESEC: Objection.

19 A. I am not a biologist. I have no idea whether
20 any of these cellular changes relate to emphysema or
21 anything.

22 Q. Well what --

23 A. I don't know.

24 Q. What do you recall that the report said?

25 MR. PLESEC: Objection.

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1 A. Let me -- let me try to help you out this way:
2 We have a number of biological tests that we conduct
3 at R.J. Reynolds. They have certain endpoint
4 measurements. I don't know what any of these
5 endpoint measurements mean to disease. Some of the
6 biologists have theories. They have ideas. I have
7 no idea.

8 Q. I'm not asking --

9 A. But they are comparative measures that we use
10 for our cigarettes.

11 Q. Look, the best way you can help me out is by
12 answering my questions, and what I'm asking you is
13 not for your interpretation. I'm asking you do you
14 remember what the words written were. Do you
15 remember anything about the cellular changes, what
16 was reported?

17 MR. PLESEC: Objection. He is answering
18 your questions, and if you would frame your questions
19 properly, he -- and listen to his responses --

20 MR. O'FALLON: Counsel, I don't want to
21 hear this.

22 MR. PLESEC: -- then you would get -- then
23 you would get the answers.

24 MR. O'FALLON: I don't want to hear this.

25 MR. PLESEC: Well please don't --

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1 MR. O'FALLON: If you want to object, you
2 object.

3 MR. PLESEC: -- please don't point your
4 finger at me.

5 MR. O'FALLON: But other than that, let him
6 answer the question.

7 MR. PLESEC: Excuse me, I was in the middle
8 of a -- an objection.

9 MR. O'FALLON: That's not a legal basis,
10 sir.

11 MR. PLESEC: Please don't point your finger
12 at me or raise your voice or anything of that
13 nature. Let's keep this thing on an even keel.

14 He --

15 MR. O'FALLON: Well let's not coach the
16 witness.

17 MR. PLESEC: He is trying to answer your
18 questions. He has answered your questions. Put the
19 questions to him succinctly. Listen to his
20 response. When he -- when you get an answer, then
21 move on to the next question.

22 MR. O'FALLON: Well listen, Counsel, first
23 of all, I don't appreciate being told how to conduct
24 a deposition, and let me just read the question
25 because if you can think of a more succinct way to

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1 put this, then why don't you -- why don't you educate
2 me a little bit.

3 Here's what I said. Now see if this isn't a
4 succinct question.

5 BY MR. O'FALLON:

6 Q. Sir, what do you recall that the report said?

7 The words written, what do you recall about the words
8 written under pathological findings? Do you recall
9 any of the words written there?

10 MR. PLESEC: Objection.

11 A. I don't recall.

12 Q. Now I'm a lawyer and not a trained scientist,
13 and yet I can usually understand at least some
14 pathological findings. Is it your testimony that
15 when you read a report that gives pathological
16 findings, you have absolutely no idea what those
17 reports mean?

18 MR. PLESEC: Objection.

19 A. I'm not a biologist. I'm not a bio --
20 biochemist. I do take the conclusions from our
21 experts in that area. I don't understand what
22 cellular changes occur on inhalation with cigarette
23 smoke.

24 Q. You don't understand anything about those
25 cellular changes?

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1 A. No, I don't.

2 MR. PLESEC: Objection.

3 Q. At R.J. Reynolds have you ever done any
4 long-term inhalation tests past 90 days?

5 MR. PLESEC: Objection.

6 A. I believe there have, but I don't -- I don't
7 know the details of it.

8 Q. What ones do you believe were done and when were
9 they done?

10 MR. PLESEC: Objection.

11 A. I don't know the details. I don't remember. I
12 think we've -- we've had experimental programs
13 looking at a variety of different biological tests.
14 I know there's been a variety of new types of -- of
15 bioassays evaluated. I know there's been
16 modifications to existing bioassays eval --
17 evaluated, but I just don't know the details.

18 Q. In the last five years has R.J. Reynolds
19 conducted an inhalation test on animals that lasted
20 more than 90 days?

21 MR. PLESEC: Objection.

22 A. I don't know.

23 Q. In the last ten years has R.J. Reynolds
24 conducted an inhalation test on animals using
25 cigarette smoke that lasted more than 90 days?

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1 MR. PLESEC: Objection.

2 A. I don't know. I'm telling you that I think
3 we've ex -- we've evaluated or explored longer-term
4 inhalation tests, I think.

5 Q. Okay.

6 A. But I don't know the details.

7 Q. Well, do you know -- I mean, that -- that's part
8 of my problem. I mean, your testimony in this case,
9 if I understand, is that you have a very strong
10 opinion that Reynolds has been responsive to the
11 smoking-and-health issues and has provided the
12 consumer with a broad range of products that directly
13 address the smoking-and-health issue and that you've
14 been a very responsive research and development
15 department. Is that basically what you're going to
16 testify to?

17 MR. PLESEC: Objection.

18 A. I think that's a paraphrase of --

19 Q. Okay.

20 A. -- what I intend to testify to.

21 Q. Well then what I need to understand is what
22 you've all done, and inhalation tests are an
23 important part of what you either have or haven't
24 done.

25 So why don't you tell me when you first learned

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1 of an inhalation test that had been done on animals
2 using cigarette smoke at R.J. Reynolds.

3 MR. PLESEC: Objection.

4 A. When I first personally learned?

5 Q. Yeah. When did you learn of that being done or
6 that -- that it had been done?

7 A. I don't recall.

8 Q. Okay.

9 A. Long time ago.

10 Q. Do you know when the first inhalation test was
11 done by R.J. Reynolds?

12 A. Nope.

13 Q. Do you know the nature of any of the inhalation
14 tests -- well strike that.

15 To the best of your knowledge, have any
16 inhalation tests been done at R.J. Reynolds prior to
17 1970?

18 MR. PLESEC: Objection.

19 A. I don't know.

20 MR. PLESEC: Dan, we've been going for
21 almost an hour and 25 minutes. Can we take a break
22 soon?

23 MR. O'FALLON: Well let me just -- let me
24 just wrap up this particular area, and the area again
25 is inhalation tests.

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1 Q. You don't know whether there have been any
2 inhalation tests done prior to 1970; correct?

3 MR. PLESEC: Objection.

4 A. I said I don't know. I don't know.

5 Q. Okay. Do you know whether any inhalation tests
6 were done between 1970 and 1980?

7 MR. PLESEC: Objection.

8 A. I don't know any details on that.

9 Q. Well when you say things like, "I don't know any
10 details," that causes me con -- concern. What do you
11 know generally if you don't know the details of it?
12 Do you have some general knowledge about them?

13 MR. PLESEC: Objection.

14 A. I know generally that we've had a number of
15 biological assays internal to Reynolds for a number
16 of years. I don't know when each of them started. I
17 don't know how they've all been used. I know that
18 we've contracted external to Reynolds in contract
19 laboratories to provide biological testing of a
20 number of things.

21 And I know that in the early '80s we geared up
22 and developed a -- a very powerful biological and
23 toxicological laboratory.

24 Q. But again what I'm trying to focus on here is
25 inhalation testing, and so at some point in the 1980s

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1 it's your understanding that you did gear up and
2 start doing inhalation tests of at least a short-term
3 nature; correct?

4 MR. PLESEC: Objection.

5 Q. 90 days.

6 A. In the early '80s we geared up the biology and
7 toxicology laboratories. I don't know when we
8 started doing inhalation testing.

9 Q. Okay. But sometime after that point, the early
10 '80s or the mid-'80s, you are aware that inhalation
11 tests were done; correct?

12 MR. PLESEC: Objection.

13 A. We've conducted inhalation tests for a number of
14 years at Reynolds. I don't know when that began.

15 Q. Okay. But -- but as far as you know, that
16 particular -- these modern inhalation tests began
17 sometime in the 1980s would be the best of your
18 recollection?

19 MR. PLESEC: Objection.

20 A. I would have to guess.

21 Q. Well I want you to give me your best estimate.
22 I don't want a guess, but I want your best estimate.
23 You're a person who's the chief scientist at R.J.
24 Reynolds.

25 A. My best -- my best guess is that we started

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1 inhalation tests internal to Reynolds for 90-day
2 exposure in the -- in the 1980s.

3 Q. Okay. And continued those up until today?

4 A. We conduct those today.

5 Q. Okay. Now, from the 1980s when these inhalation
6 tests started until the present day, to the best of
7 your knowledge, have you ever done inhalation tests
8 that have went over 90 days?

9 A. As I said earlier, I think there have been tests
10 that have gone more than 90 days. I don't know
11 whether that's exploratory. I suspect it was because
12 we're always trying to improve the biological tests.
13 We're always trying to develop new biological tests.

14 Q. Okay.

15 A. The details of that, I have no idea.

16 Q. What's the longest test that you know about?

17 A. I don't --

18 MR. PLESEC: Objection.

19 A. I don't know.

20 Q. To the best of your knowledge, have you ever had
21 a two-year test?

22 MR. PLESEC: Objection.

23 A. Internal to Reynolds?

24 Q. Yes.

25 A. I don't know.

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1 Q. To the best of your knowledge, what animals have
2 been used for the inhalation tests?

3 A. I can't tell you specifically which animals.

4 They are --

5 Q. I'm just looking for species.

6 A. Well they are rats, I believe.

7 Q. Any animals other than rats?

8 A. I'm really not sure. I don't think so.

9 Q. And prior to the 1980s, you don't know any
10 details of inhalation tests done prior to that time,
11 the 1980s; correct?

12 MR. PLESEC: Objection.

13 A. Specifically internal to Reynolds, I don't know
14 the details of any tests that were done prior to the
15 '80s.

16 MR. O'FALLON: Okay. Why don't we take a
17 break.

18 THE REPORTER: Off the record, please.

19 Q. Well, again when we're talking tests, we're
20 talking inhalation tests; right?

21 MR. PLESEC: Objection.

22 A. That was my understanding.

23 Q. Okay. Thank you.

24 MR. O'FALLON: Why don't we take a break.

25 THE REPORTER: Off the record, please.

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1 (Recess taken.)

2 BY MR. O'FALLON:

3 Q. Dr. Townsend, during the first part of the
4 deposition, you talked about some of the various
5 projects that you've been involved on and we've now
6 had a discussion of the EW cigarette. The next thing
7 you mentioned was a low-CO cigarette.

8 A. That's correct.

9 Q. Did that project go by any other name, any
10 acronym?

11 A. We've had several projects to try to reduce
12 carbon monoxide in mainstream cigarette smoke.
13 There's been a low-CO project called as such. There
14 was a R-E-D-C-O, REDCO, for reduced-CO project. RCM,
15 reduced-chemistry menthol, it was intended to be a
16 menthol version of carbon monoxide reduction along
17 with reductions in other constituents.

18 There -- there have been a number of acronyms
19 over the years.

20 Q. Okay. And why were you attempting to reduce
21 CO?

22 A. Because it's present in cigarette smoke and it's
23 thought to be a potential problem.

24 Q. What problem is it thought to cause?

25 A. Carbon monoxide at levels in cigarette smoke

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1 certainly reduces the oxygen transport capability of
2 the blood to a degree.

3 Q. And what effect does that have?

4 A. Well again I'm not a biologist or a biochemist,
5 but there's less oxygen getting to the brain and to
6 other parts of the body.

7 Q. Is that thought to have some impact on the
8 cardiovascular system?

9 MR. PLESEC: Objection.

10 A. Well I don't know. I know it -- it -- you know,
11 I -- I don't know what the biological effects are
12 really. I know what the biological effects are of
13 extreme exposure to carbon monoxide.

14 Q. That would be death; right?

15 A. I would suppose so, yeah.

16 Q. But again, as far as the low-dose carbon
17 monoxide, what was it your understanding as one of
18 the people working on the project for the reasons
19 that you were trying to reduce that in addition to it
20 simply reduces the amount of oxygen available? Were
21 there any other physiological effects that were
22 thought to be harmful?

23 MR. PLESEC: Objection.

24 A. Well I'll -- I'll tell you -- I'll tell you the
25 way we go about product development. Maybe that will

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1 help answer your question. We look at a variety of
2 concerns that are expressed by scientists in the --
3 in the scientific community. Many scientists have
4 expressed concern over carbon monoxide in cigarette
5 smoke, and we've tried to reduce it.

6 So in my view, we -- you know, we responded to
7 those -- those concerns. I -- I know I've heard or
8 seen in the literature particular -- particular
9 concern about moderate carbon monoxide level exposure
10 for angina patients. I really don't understand the
11 biology of -- of what all that means, though.

12 Q. Did you at R.J. Reynolds ever do any testing or
13 work to determine if in fact CO at the level it's
14 found in cigarette smoke does have adverse biological
15 effects?

16 MR. PLESEC: Objection.

17 A. I know that there's been a lot of discussions.
18 There's been a lot of review of the literature.
19 There have been discussions with scientists outside
20 of Reynolds. I don't know whether research inside
21 Reynolds has ever been conducted or not.

22 Q. Okay. So it may have been; it may not have
23 been. You just don't know?

24 MR. PLESEC: Objection.

25 A. I don't know whether it has or not.

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1 Q. And again, R.J. Reynolds, at least at the
2 current time, does have animal testing capability;
3 right?

4 MR. PLESEC: Objection.

5 A. We have animal testing capability for a number
6 of assays.

7 Q. And there would be nothing to prevent R.J.
8 Reynolds from testing animals for exposure to CO in
9 the levels found in cigarette smoke if they chose to
10 do those tests; correct?

11 MR. PLESEC: Objection.

12 A. I'm not an expert in this area. I don't know
13 the details of how one would go about it. I do know
14 that we use animals in a number of tests, in a number
15 of biological tests. I know we have exposure
16 facilities where we expose animals or can expose
17 animals to mainstream smoke. I -- I don't know -- I
18 don't know what the details of setting up that kind
19 of experiment would be or if it's been done.

20 Q. Don't you think it's important that when an
21 issue is raised about your company's products, such
22 as the fact that the levels of CO in your cigarettes
23 may cause detrimental effects on a human being, such
24 as heart disease or aggravate heart disease, that the
25 company undertake to find out whether in fact that

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1 substance as it exists in a product you sell does in
2 fact have adverse effects? Don't you think that
3 should be done?

4 MR. PLESEC: Objection.

5 A. I think from the product development point of
6 view, the one thing that we do for sure is we look at
7 those compounds and try to figure out ways to reduce
8 or eliminate them.

9 Q. Well but isn't that really step two? I mean,
10 shouldn't step one be that you actually try to
11 determine whether or not that substance or that
12 compound has an adverse effect in an animal model?

13 MR. PLESEC: Objection.

14 A. I don't know that in a complex matrix like
15 cigarette smoke, whether that's possible or not; in
16 many cases, it's probably not. We've assumed that
17 there are adverse health effects to those
18 constituents and we've sought to design cigarettes to
19 reduce or eliminate them. To me, that's -- that's a
20 scientific -- scientifically reasonable approach to
21 take. You're assuming a hypothesis like carbon
22 monoxide, for example, is in fact dangerous at the
23 levels in cigarette smoke. Now how can we reduce or
24 eliminate it?

25 Q. But shouldn't you first test that hypothesis to

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1 find out whether or not in fact, for instance, the
2 levels of carbon dioxide -- or carbon monoxide in
3 cigarette smoke are in fact dangerous? Shouldn't you
4 do that?

5 MR. PLESEC: Objection.

6 A. I don't understand that because, you know, you
7 may wind up conducting biological tests that don't
8 have a clean answer. I know that our scientists who
9 are biologists and toxicologists have -- have talked
10 with and worked with scientists from around the world
11 on many of the controversial compounds in mainstream
12 smoke and tried to determine if they're -- if -- if
13 it's reasonable that they should be dangerous at the
14 levels that they're present in cigarette smoke. I
15 know that they've reviewed the scientific literature
16 and tests that have been done even outside of the
17 tobacco smoke matrix.

18 But from the product development point of view,
19 we assume that those controversial compounds that
20 are -- that are thought to -- to be a problem are a
21 problem, and then we seek to -- to reduce or
22 eliminate them.

23 Q. But certainly a company like yours that makes
24 billions of dollars a year -- I believe you've
25 previously testified profit alone last year was

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1 1.4 billion -- certainly you have the resources that
2 if you wanted to find out, for instance, whether
3 carbon monoxide at the levels it occurs in cigarette
4 smoke is adverse, you could do testing to find that
5 out; right?

6 MR. PLESEC: Objection.

7 A. We're really into an area that I can't really
8 speak to knowledgeably.

9 Q. Well, sir, we're -- you're a vice president of
10 product development and assessment. You're a senior
11 executive at one of the largest tobacco companies in
12 the world. Don't you think it's reasonable and
13 responsible for Reynolds to undertake basic testing
14 to determine whether in fact cigarette smoke or the
15 constituents of cigarette in smoke do in fact cause
16 disease in an animal model as a very first step?

17 MR. PLESEC: Objection. Dan, are we
18 confusing ourselves here on -- on the purpose of this
19 deposition? He's here as an expert on cigarette
20 design and not as a -- a 30.02 witness.

21 MR. O'FALLON: His testimony goes extremely
22 broad in his expert testimony, sir. If you want to
23 look at the Raulerson testimony, I think you could
24 see that he's all over the board stating that
25 everything that this research and development

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1 department did was reasonable, and I'm just asking as
2 a basic precursor before you undertake to do this.

3 Now, I'm not going to sit here and debate you as
4 to whether this is appropriate or not. If you don't
5 think it's appropriate, I tell you what, you go to
6 the judge, and -- and if he tells me that I can't ask
7 these questions, then I won't ask these questions.

8 But for right now I'm going into what I understand to
9 be the precursors of his understanding and his
10 testimony, and that's what we're going to talk
11 about. We're going to talk about R&D and we're going
12 to talk about whether you do step one or step two
13 first.

14 MR. PLESEC: Okay. Well if you want to
15 pursue this line of questioning, that's -- that's
16 fine, but it's outside his area of expertise. He's a
17 cigarette design expert.

18 MR. O'FALLON: Well you've offered him for
19 a whole lot broader topics than cigarette design. I
20 mean, if you want me to go back and pull out line and
21 verse from his previous testimony, which has been
22 incorporated in his expert report, I can --

23 MR. PLESEC: Well --

24 MR. O'FALLON: -- start doing that as a
25 precursor to every one of these questions.

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1 MR. PLESEC: Well you pursue the
2 examination the way you want. I think this is
3 objectional, but go right ahead.

4 MR. O'FALLON: I think that would be
5 appropriate, for you to allow me to do that. I don't
6 really think it's appropriate for you to sit here and
7 tell me how to do the examination, but if you have a
8 valid objection and think that honestly I'm in an
9 area that I am not entitled to go into, then if we
10 need to, we can stop and we can go to the judge on
11 it.

12 MR. PLESEC: Well it's -- it's a question
13 of, you know, if you had a -- taking a deposition of
14 a cardiologist and you're asking him questions about
15 brain surgery, it doesn't make much sense, and I
16 believe the kind of inquiry you're trying to get into
17 now is outside of his scope.

18 MR. O'FALLON: Sir, I don't really have any
19 desire to further engage you in a -- in a colloquy.
20 If you want to continue to talk, let me know. It's
21 your time.

22 MR. PLESEC: Next question.

23 MR. O'FALLON: Well let's -- let's go back
24 and get an answer to the first question since you've
25 basically blocked that question.

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1 BY MR. O'FALLON:

2 Q. Here was my question: You're a vice president
3 of product development and assessment. You're a
4 senior executive of one of the largest tobacco
5 companies in the world. Don't you think it's
6 reasonable and responsible for Reynolds to undertake
7 basic testing to determine whether in fact cigarette
8 smoke or the constituents of cig -- of cigarettes in
9 the smoke do in fact cause disease in an animal model
10 as a very first step in research and development?

11 MR. PLESEC: Okay. Objection, foundation,
12 argumentative.

13 A. I think I can answer your question in a general
14 sense because I am not an expert in the area of
15 biology or toxicology. At Reynolds we do conduct
16 biolog -- biological tests. We conduct toxicological
17 tests and -- and try to understand the levels of a
18 variety of constituents that are in smoke. We try to
19 understand from the literature or from testing,
20 either internal to Reynolds or through contract
21 research or through discussions at scientists at
22 universities, what that may mean in -- in terms of
23 health.

24 Let me make it clear that we do conduct
25 biological research. For example, one of the things

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1 that we're studying intensely now is DNA adduct
2 formation. It's basic research. We're not the
3 leaders in the field by any stretch of the
4 imagination; a number of folks at universities are.
5 We're working with those. We're talking. We're
6 engaging in scientific discussions with a variety of
7 experts around the world to try to understand DNA
8 adduct formation and how it may be important to
9 chronic disease.

10 Q. What's your ultimate endpoint of that DNA
11 testing?

12 MR. PLESEC: Objection.

13 A. Again I'm not a biologist. I do understand, I
14 believe, that they isolate the DNA and look for
15 adducts.

16 Q. And what's the endpoint, sir?

17 MR. PLESEC: Objection.

18 A. What do you mean "endpoint"?

19 Q. Are you trying to find an alternate explanation
20 for why cigarette smoke causes cancer and other
21 diseases?

22 MR. PLESEC: Objection.

23 A. We're trying to understand changes that occur or
24 may occur on exposure to smoke.

25 Q. Okay. And when did that DNA research start?

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1 A. Best of my recollection, a couple years ago.

2 Q. So what, '94, '95, somewhere around there?

3 A. The best of my rec -- recollection, a couple
4 years ago.

5 Q. Okay. It's been alleged that smoking has caused
6 cancer since nineteen -- the 1950s; right?

7 MR. PLESEC: Objection.

8 A. In the 1950s the epi -- epidemiology really
9 began to be published and began to be understood.

10 Q. Well it wasn't just the epidemiology, was it,
11 sir?

12 MR. PLESEC: Objection.

13 A. In the early '50s were the first successful --
14 the first reports of successful mouse skin painting
15 studies as well.

16 Q. So it was a combination of epidemiology; that
17 is, a review of human statistics and human disease,
18 coupled with a review of animal models and animal
19 testing, both of which showed that cigarette smoke
20 caused cancer; correct?

21 MR. PLESEC: Objection.

22 A. In the early '50s both the statistics, the
23 epidemiology, was published as well as the first
24 successful mouse skin painting, which showed excess
25 tumor production on exposure to whole-smoke

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1 condensate.

2 Q. And yet in the 40 years between the early 1950s
3 and 1994, Reynolds did no biological testing to
4 determine if in fact cigarette smoke caused the
5 diseases it was alleged to cause; correct?

6 MR. PLESEC: Objection.

7 A. I'm sorry, can you repeat that?

8 Q. Sure. And yet in the 40 years between the early
9 1950s and 1994, Reynolds did no biological testing to
10 determine if in fact cigarette smoke caused the
11 diseases it was alleged to cause; correct?

12 MR. PLESEC: Repeat the objection.

13 A. I -- I think that's an overgeneralization. I
14 think we've conducted biological research and
15 toxicological research in many different areas, and
16 the reason we do it is because cigarette smoking is
17 risk -- is a risk.

18 Q. But is the endpoint you're looking for, are you
19 actually looking to determine whether in fact
20 cigarette smoke causes disease, or are you looking at
21 something else?

22 MR. PLESEC: Objection.

23 A. I think -- I think part of what we're trying to
24 do is understand why cigarette smoking is a risk. I
25 think part of what we're trying to do is understand

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1 mechanisms of disease. We're trying to understand
2 how cigarette smoking may cause those diseases.

3 I think it's -- it's -- it's a large package.
4 And we're looking at many different aspects of
5 cigarette smoking and health.

6 Q. What biological testing are you aware of that
7 occurred prior to the 1980s?

8 MR. PLESEC: Objection.

9 A. Through contract laboratories we conducted mouse
10 skin painting, for example, inhalation tests as well
11 as short-term in -- in vitro tests.

12 Q. Okay. Let me rephrase my question.

13 What biological testing are you aware of prior
14 to the 1980s that occurred in-house at R.J.
15 Reynolds?

16 MR. PLESEC: Objection.

17 A. I know there was a biological research division
18 at R.J. Reynolds in the '60s. I don't know the
19 extent of what they were doing in their research
20 programs. I know that program, the biological
21 research division stopped its work in the early '70s,
22 I would guess, and from the early '70s until the
23 early '80s I -- I'm not aware of in -- a lot of
24 internal biological research. I know we carried on
25 some routine tests used for comparative measures

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1 like -- like Ames mutagenicity, but in terms of
2 biological research, I'm not aware of -- of any major
3 programs at Reynolds over that time period until the
4 1980s.

5 Q. And when you say "comparative measures," what
6 you're really talking about is using, for instance,
7 Ames testing to figure out whether one smoke is worse
8 than another smoke; correct?

9 MR. PLESEC: Objection.

10 A. Or to figure out if from Ames tests and maybe a
11 combination of other tests whether one smoke might be
12 better than another smoke.

13 Q. Well --

14 A. Both sides.

15 Q. Well presumably that would be both sides;
16 right? One is worse; one is better. That's what
17 you're looking at?

18 MR. PLESEC: Objection.

19 A. If --

20 Q. Or they're both the same.

21 A. If we take a product that has cigarette design
22 changes and we want to know compared to a control
23 product, either a reference or a commercial product,
24 if those design changes increased Ames activity or
25 decreased Ames activity, there are companion assays

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1 that we typically run and have for -- for many, many
2 years based on the types of chemistry changes that we
3 see. For example, if we -- if we design a cigarette,
4 build a prototype that has certain design changes and
5 it effects reductions in certain mainstream
6 chemistry, we run the bi -- biology or certain
7 biological assays to see if we also see a reduction
8 there as well.

9 We also run biological testing not only to see
10 if we've done something good in the cigarette design,
11 but we also run biological testing for stewardship,
12 to make sure that changes that we haven't made --
13 that we've made to a product don't increase the
14 biological burden.

15 Q. Don't make the smoke worse; correct?

16 A. That's -- and what I'm saying is we look at both
17 sides of it.

18 Q. Well --

19 A. We're trying to improve products and we're also
20 trying to make sure that we don't increase biological
21 burden.

22 Q. Certainly the -- it's not your testimony that
23 there's any cigarette that's good for you from a
24 health standpoint, are you?

25 MR. PLESEC: Objection.

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1 A. Cigarette smoking is risky. I wouldn't say it's
2 good for you.

3 Q. Right. It's dangerous, isn't it?

4 MR. PLESEC: Objection.

5 A. I said cigarette smoking is risky.

6 Q. Is it dangerous?

7 A. It may be.

8 Q. You don't know?

9 A. It's clear to me that cigarette smoking is a
10 risky practice. Cigarette smokers as a group have
11 higher incidence of lung cancer, emphysema, chronic
12 heart problems and a variety of other things. So
13 it's certainly risky.

14 Q. My question was: Is it dangerous?

15 MR. PLESEC: Objection.

16 Q. Can you answer that with a "yes" or "no" or
17 not?

18 A. I don't know what the difference in your mind is
19 between dangerous and risky.

20 Q. You believe dangerous and risky are the same
21 things?

22 MR. PLESEC: Objection.

23 Q. I mean, if you do, that's fine.

24 A. It's hard for me to see a difference.

25 Q. Okay. Well is it a fact that cigarette smoking

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1 is dangerous then?

2 MR. PLESEC: Objection.

3 A. I believe that cigarette smoking is risky.

4 There's no question about that in my mind. If by
5 "dangerous" you're trying to imply that it causes
6 those diseases, I don't know; it may.

7 Q. Well, I mean, that's just a matter of common
8 sense; right? I mean, of course I'm -- I'm implying
9 that it causes those diseases. I mean, that just
10 makes a matter of common sense and typical usage of
11 the English language.

12 Is it your testimony that smoking does not cause
13 disease?

14 MR. PLESEC: Objection and move to strike
15 the first part of the question.

16 A. That is definitely not my testimony. I can't
17 sit here and tell you that cigarette smoking does not
18 cause those diseases. You can't prove a negative.
19 What I am here to tell you is that cigarette smoking
20 is a risk --

21 Q. Is it more likely --

22 A. -- of those disease.

23 Q. Is it more likely than not that cigarette
24 smoking causes disease? Can you tell me that? Can
25 you use probables?

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1 MR. PLESEC: Objection.

2 A. I have no idea.

3 Q. You just don't know?

4 A. I don't know.

5 Q. For 40 years we've been looking at this issue,

6 and, gosh, the cigarette industry still doesn't

7 know?

8 MR. PLESEC: Objection. Counsel, you're
9 argumentative now.

10 Q. Is that your testimony?

11 MR. PLESEC: Objection.

12 A. I said I don't know.

13 Q. Have you ever heard of a company called

14 P. E. Brubaker?

15 A. Brubaker, I've heard the name.

16 Q. Where did you hear it?

17 A. Inside Reynolds.

18 Q. In what context?

19 A. I think I've heard the name from one of my
20 colleagues at Reynolds.

21 Q. Who?

22 A. Dr. Sam Simmons.

23 Q. What did Dr. Simmons say about Brubaker?

24 A. I can't recall. I've just heard the name. I
25 have no idea what Brubaker is.

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1 Q. Have you ever seen any reports issued by the
2 Brubaker company?

3 A. Not to my knowledge.

4 Q. Have you ever seen any reports of the biological
5 research that was undertaken in the late '60s and
6 terminated in 1970?

7 A. Reports from the biological research division?

8 MR. PLESEC: Objection.

9 Q. Or a report by P. E. Brubaker about that
10 research.

11 MR. PLESEC: Objection.

12 A. I can't recall in -- seeing any reports by
13 Brubaker. I have heard the -- the name or the term.
14 And I don't recall seeing specific reports that were
15 produced by the biological research division. I may
16 have. I just don't recall any.

17 Q. Isn't that something that you'd want to see?

18 MR. PLESEC: Objection.

19 A. Well as a physical organic chemist, it's hard
20 for me to interpret results or understand results
21 that comes out of biological research. Frankly, I
22 need interpretation for that. Even today if -- if I
23 have questions about bio -- the performance of some
24 of my new prototypes in biological testing, I may
25 read the reports that come out of our biological

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1 research division now on those -- on those
2 evaluations, and ultimately I still have to go to an
3 expert to -- to get interpretation, see what that
4 means and also see what we need to do next.

5 Q. When you were in college, did you ever take any
6 biology classes?

7 A. I didn't like biology very much. I -- when I
8 was an undergraduate, I took zoology.

9 Q. Did you take biology?

10 A. I took biology in high school. I didn't --
11 didn't in college.

12 Q. Ever take any pathology or classes like that?

13 A. No.

14 Q. And again, as a trained chemist it's just real
15 hard for you to understand any of that biological
16 research stuff?

17 MR. PLESEC: Objection.

18 A. In a superficial sense, I certainly understand
19 some things. I'm not -- I certainly wouldn't suggest
20 that I can interpret research or -- or -- or even
21 guide research of that sort.

22 Q. But can you read conclusions and basically
23 understand conclusions?

24 A. I think sometimes I -- I can read conclusions
25 and understand them, sure.

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1 Q. And you didn't go back and read any of the
2 conclusions reached in the biological testing that
3 was done by Reynolds in the late '60s, terminating in
4 1970?

5 MR. PLESEC: Objection.

6 A. I don't remember ever seeing any reports from
7 the biological research division. I -- I said I may
8 have because I go to the library from time to time,
9 and I don't -- I don't remember specifically seeing
10 one, though.

11 Q. Did the low-CO product that you were looking at,
12 did that result in any commercial product?

13 A. No. We have some problems with the consumer
14 acceptability of that product at this time. We're
15 trying to figure out how to get around that problem,
16 how to improve it.

17 Q. By the way, when you commercialized the EW
18 cigarette down in Oklahoma, how did you advertise
19 it?

20 A. It was advertised as Winston Select.

21 Q. No, no. What -- what attributes did you
22 advertise of it?

23 MR. PLESEC: Objection.

24 A. It was advertised with a tag line something like
25 "flavor filter smooths your smoke, less irritate --

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1 irritating."

2 Q. So you never told the people in Oklahoma that
3 you thought you had reduced some of the biological
4 activity in that?

5 A. That's correct.

6 Q. Do you think people would want to know that
7 information?

8 MR. PLESEC: Objection.

9 A. My personal opinion is yeah, I think smokers
10 would want to know that, and as a product developer,
11 I would want the smokers to know that.

12 Q. But was the problem that you didn't really do
13 the testing to back up those claims?

14 MR. PLESEC: Objection.

15 A. That's not correct at all. We did testing.

16 As -- as I described before, we saw major -- we did
17 testing in two major areas, in chemistry and
18 biology. We saw major reductions in a number of
19 target compounds or analytes. We saw major reduction
20 in four assays. Obviously as we've talked about
21 before, there were some assays that didn't change.

22 Q. Those assays that didn't change were actually
23 the testing of the smoke on animals; correct?

24 MR. PLESEC: Objection.

25 A. The Alarie test is a whole animal, live animal

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1 test.

2 Q. Is the Alarie test a skin painting test?

3 A. No.

4 Q. Okay.

5 A. It's an inhalation test.

6 Q. That's --

7 A. It's actually not an inhalation test per se.

8 It's a -- it's a -- it's an animal test in which

9 breathing rate changes are measured. It's an

10 irritation test in my estimation.

11 Q. But it was my understanding that on the

12 inhalation tests and the skin painting tests there

13 was no change between the reference and the test

14 cigarette. Correct?

15 A. That's correct. We saw a reduction in the

16 Alarie inhalation test, which -- which is a measure

17 of irritation, because it measures changes in the

18 animal's breathing rates. We saw a reduction, a

19 significant reduction, in neutral red cytotoxicity.

20 We saw a major reduction in sister chromatid exchange

21 and also in Ames mutagenicity.

22 Q. Why do you do mouse skin -- mouse skin testing?

23 I thought R.J. Reynolds has been roundly critical of

24 mouse skin testing.

25 MR. PLESEC: Objection.

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1 A. It's -- I don't think it's fair to say that
2 Reynolds has been roundly critical. I think it's
3 clear, at least from my point of view after talking
4 to many people, that mouse skin painting is one tool
5 and only one tool. It's one assay that can be used
6 as a screening tool. It probably measures some
7 events that are different than what other biological
8 assays measure.

9 Q. And the specific event it measures is
10 tumorigenicity; correct?

11 A. It measures excess tumor production. But also,
12 if -- if -- if one looks at a variety of biological
13 endpoints, there can often be conflict in the
14 results. For example, some design changes that may
15 reduce mouse skin painting tumorigenicity may
16 increase Ames mutagenicity.

17 Our scientists believe that one needs to conduct
18 a variety of biological assays and look at the entire
19 package along with chemistry rather than focus on one
20 particular assay as -- as the ultimate test because
21 there is no ultimate test.

22 Q. Right. What you need to do is as much testing
23 as possible in order to get a complete picture of the
24 biological activity; correct?

25 MR. PLESEC: Objection.

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1 A. I think my summary of -- of where we are is that
2 R.J. Reynolds' scientists believe that one needs to
3 conduct a number of biological tests, one needs to
4 conduct also chemistry, and the -- the entire package
5 of the biological testing and chemistry then can lead
6 you to some judgment about whether you've -- you've
7 made any progress.

8 Q. And the bottom line is you want to get as much
9 information as possible; correct?

10 MR. PLESEC: Objection.

11 A. The bottom line is we want to get enough
12 information to make some judgment about whether we've
13 done anything useful or not.

14 Q. And ultimately the best tests would be long-term
15 animal tests because, as we all know, humans
16 typically don't smoke cigarettes for just 90 days;
17 correct?

18 MR. PLESEC: Objection.

19 A. Well I don't know. You're asking my opinion as
20 a chemist on something that's really a matter of
21 biology. I -- I don't know whether a long-term test
22 would necessarily add that much to the -- to it. I
23 just don't know.

24 Q. Well I guess it would depend. I mean, if you
25 filled up a mouse with tumors in 90 days, then it

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1 probably doesn't add a whole lot, but if you haven't,
2 it may; right?

3 MR. PLESEC: Objection.

4 A. Well now you're mixing a 90-day inhalation study
5 and a mouse skin painting, which --

6 Q. Okay.

7 A. -- typically runs longer, so you've mixed the
8 two issues.

9 Q. Well let's say you fill up a mouse with tumors
10 on inhalation. Then there would probably be no
11 reason to go longer than that. You've already
12 figured out that whatever it is you're testing isn't
13 particularly good for you; right?

14 A. Well I don't --

15 MR. PLESEC: Objection.

16 A. I don't understand. I think that's -- that's
17 hypothetical. We don't see tumors in that type of
18 inhalation test.

19 Q. Well you see cellular changes; right?

20 A. We see cellular changes, certainly.

21 Q. If you did the tests long enough, you might see
22 tumors; right?

23 MR. PLESEC: Objection.

24 A. I don't know. I'm not a biologist.

25 Q. I mean, some of the changes you see in the

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1 pathology of those lungs are considered precursors
2 for tumor formation; correct?

3 A. I don't know.

4 MR. PLESEC: Objection.

5 A. I'm not a biologist.

6 Q. Do you ever recall that being reported in any
7 test?

8 A. I'm not a biologist; I really can't speak to
9 that.

10 Q. I'm really not asking for your expert opinion.

11 I'm asking whether you recall anything similar to
12 that being reported, whether the report itself said
13 that.

14 MR. PLESEC: Objection. What is "that"?

15 MR. O'FALLON: Changes, pathological
16 changes, in cells that are considered to be
17 precursors of tumor formation.

18 A. In the inhalation test, I don't know whether the
19 cellular changes that are observed are precursors to
20 tumor formation. I have no idea, and I don't recall
21 discussing that with anybody.

22 Q. Did your air dilution work result in a
23 commercial product?

24 A. Air dilution?

25 Q. Yes.

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1 MR. PLESEC: Objection.

2 A. Air dilution is present in most commercial
3 products today.

4 Q. When is the first time that Reynolds employed
5 air dilution technology?

6 A. Early '70s.

7 Q. In what cigarette?

8 A. I can't tell you the first cigarette for sure.
9 I think it was probably Now, to the best of my
10 recollection.

11 Q. Does air dilution alter the tar-to-nicotine
12 ratio in a cigarette?

13 A. I think to a small degree it does.

14 Q. When you say "to a small degree," how much?

15 A. If one takes a non-air-diluted cigarette and
16 measures the tar-to-nicotine ratio, typically that
17 ratio will be 12, 12 to 13. If one very highly air
18 dilutes the cigarette up to maybe 80 percent, 75 to
19 80 percent air dilution, which is an extremely high
20 level, the tar-to-nicotine ratio will drop to 9 or
21 10.

22 Q. What's the highest tar-to-nicotine ratio of an
23 R.J. Reynolds product currently on the market?

24 A. I can just give you a general ballpark. We'd
25 have to go back and look at specific data to -- to be

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1 able to absolutely say, "This is, you know, what is
2 the highest absolute number." So a ballpark is about
3 13.

4 Q. And what's the lowest?

5 A. Again I can't give you a specific number as to
6 the lowest. I can give you a general idea, and it's
7 about 10.

8 Q. Has R.J. Reynolds ever put a product on the
9 market that had a tar-to-nicotine ratio below 10?

10 A. I'm not aware of commercial products that are on
11 the market or have been put on the market that are
12 substantially below 10.

13 Q. Well what do you mean by "substantially"?

14 A. I mean that cigarette products are -- are
15 variable. They're agriculture products. There is
16 some variation from crop to crop in -- in
17 tar-to-nicotine ratio. There is some manufacturing
18 variability. Variability in air dilution level, for
19 example, will cause some variability in the measured
20 tar-to-nicotine ratio.

21 And what I'm saying is that I'm not aware of --
22 of substantially lower tar-to-nicotine ratios in
23 commercial products below 10 --

24 Q. Well --

25 A. -- outside of variability.

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1 Q. -- how low do you go when you say not
2 substantially below 10?

3 A. Well you're asking me to define an absolute
4 cutoff, and to do that I'd have to go back and look
5 at quality control charts and all of that sort.

6 Q. Well I'm asking you for your understanding.

7 MR. PLESEC: Objection.

8 Q. What's your understanding of the lowest
9 tar-to-nicotine ratio cigarette that RJR has ever
10 commercialized?

11 A. I can give you a ballpark figure of the lowest,
12 and I said I think it's 10. And then you're pressing
13 me for some measure of the variability --

14 Q. Well --

15 A. -- about that, and I will go out on a limb and I
16 will say probably as low as 9 --

17 Q. Okay.

18 A. -- variability. That's a guess.

19 Q. And let's just be clear about this. R.J.

20 Reynolds can control all of the variables regarding
21 tar and nicotine; correct?

22 MR. PLESEC: Objection.

23 A. "Can control all of the variables regarding tar
24 and nicotine," what do you mean?

25 Q. RJR can control the tar-to-nicotine ratio.

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1 A. Okay.

2 Q. It's not dependent upon crop variability.

3 A. Well let me be very clear about it.

4 MR. PLESEC: Objection.

5 A. Technically R.J. Reynolds and our competitors
6 can change tar-to-nicotine ratio, technically.

7 Q. Absolutely. Technically and even nontechnically
8 you can control the tar-to-nicotine ratio; correct?

9 A. Well I'm not sure what you mean
10 "nontechnically." I'm saying in a technical fashion
11 one can build a cigarette, a cigarette design, that
12 has different tar-to-nicotine ratios.

13 Q. Yeah. But what I'm also saying is that within
14 any range, you, R.J. Reynolds, can control absolutely
15 the amount of nicotine and tar in your cigarettes
16 through your manufacturing process; correct?

17 MR. PLESEC: Objection.

18 A. I'm not sure how that question differs from the
19 other. You say --

20 Q. Well --

21 A. -- in any. You confused me --

22 Q. -- you like to talk about --

23 A. -- in that last question.

24 Q. You like to talk about crop variability. I
25 mean, crop variability doesn't affect your

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1 tar-to-nicotine ratios unless you want it to affect
2 your tar-to-nicotine ratios; correct?

3 MR. PLESEC: Objection.

4 A. No, that's not correct. We see variability in
5 both tar and nicotine yields as a result of
6 manufacturing variability; materials variability,
7 which includes the crop. There is some variability.

8 What you and I are talking about right now is
9 going far beyond that variability and making
10 cigarette design changes that can effect a
11 significant reduction -- or a change in
12 tar-to-nicotine ratio.

13 Q. Well actually I'm -- I'm -- first of all, let's
14 just start with the base proposition.

15 If you want a Camel cigarette to have a
16 tar-to-nicotine ratio of 13, you can through your
17 manufacturing process make sure that Camel cigarettes
18 have a tar-to-nicotine -- nicotine ratio of 13;
19 correct?

20 MR. PLESEC: Objection.

21 A. I said technically it's possible to achieve
22 whatever tar-to-nicotine ratio you want to achieve.

23 Q. Well, but your manufacturing process is set up
24 so that you can in fact determine what
25 tar-to-nicotine ratio you're going to have in any

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1 given cigarette; correct?

2 MR. PLESEC: Objection.

3 A. Our manufacturing process --

4 Q. Yes.

5 A. -- is set up to adjust tar-to-nicotine ratio?

6 Q. To make sure that a tar-to-nicotine ratio is hit

7 for any given cigarette you want to design.

8 A. Absolutely not.

9 MR. PLESEC: Objection.

10 Q. So you just haphazardly denicotinize burley
11 tobacco? You're not thinking about what it is that
12 you're trying to put in your final Camel product?

13 MR. PLESEC: Objection.

14 A. I think that's a -- that's a -- an inaccurate
15 characterization.

16 Q. Well let me ask this then: The tar-to-nicotine
17 ratios that appear on your -- in your advertising,
18 the reported tar-to-nicotine numbers, are they or are
19 they not accurate for given cigarettes? Do you or do
20 you not try to meet those numbers that are publicly
21 advertised?

22 A. We have to meet those numbers that are publicly
23 advertised and we do -- we do everything we can to do
24 that, and we're successful.

25 Q. Well that's what I'm trying to establish. So in

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1 other words, you can through your manufacturing
2 process determine exactly what tar and nicotine
3 content any given manufactured cigarette will have;
4 correct?

5 MR. PLESEC: Objection.

6 A. No, that's not correct at all. That completely
7 misunderstands our processing. Our process doesn't
8 give us the ability or our manufacturing doesn't give
9 us the ability to change tar and nicotine ratios.
10 Our cigarette design affects tar and nicotine
11 ratios.

12 Once a particular cigarette design is
13 transferred to our operations group, they manufacture
14 it in as consistently a fashion as possible. There
15 is some variability in tar and nicotine yields
16 because of materials and -- and manufacturing
17 variability, but it's not manufacturing's job to
18 adjust or target any particular tar-to-nicotine
19 ratio. Tar-to-nicotine ratios can be affected
20 substantially --

21 Q. Okay.

22 A. -- by the cigarette design.

23 Q. Okay. Well here, let's go back and reread my
24 question.

25 A. All right.

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1 Q. And what I'd like you to do is answer my
2 question, because if you'll listen to my question
3 carefully, you'll find out that I never said anything
4 about tar-to-nicotine ratio. Here it is: So in
5 other words, you can through your manufacturing
6 process determine exactly what tar and nicotine
7 content any given manufactured cigarette will have;
8 correct?

9 A. I don't understand that question.

10 Q. Well, let's clarify it for you.

11 A. Can you ask me again?

12 Q. Let's assume that you've got Camel and your
13 Camel cigarettes are testing out at -- and you're
14 listing on your packages or you're listing in your
15 advertising the following FTC numbers: You're
16 listing 1.2 milligrams of nicotine and 12 milligrams
17 of tar. Now you can through your manufacturing
18 process make certain that the Camel cigarettes that
19 you manufacture will in fact upon FTC testing meet
20 those specifications; correct?

21 MR. PLESEC: Objection.

22 A. By adjusting the manufacturing process?

23 Q. Through the manufacturing process, by adjusting
24 blend, by making sure you've got a certain amount of
25 denicotinized tobacco in it, by doing whatever you

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1 need to make sure that you're meeting the
2 specifications that are stated in your advertising in
3 your packages.

4 A. Let me try to break it down, and I think this
5 will help answer the question exactly. We -- we do
6 meet the numbers, both tar and nicotine, that are
7 required in advertising. Products -- if products are
8 made that don't meet that, we obviously do not sell
9 those if there -- if it's outside of a ship limit.

10 Q. Okay.

11 A. There can be -- if -- there can be small
12 adjustments in manufacturing, particularly through
13 the use of -- of air dilution changes. There can be
14 small changes to air dilution level by adjusting the
15 perforating lasers to move the tar and nicotine
16 levels a bit, but it's only a very small bit. So if
17 we see through quality assurance charts that the
18 product is tending on the high side of tar or on the
19 low side of tar or nicotine, we can adjust lasers
20 to -- to bring it back into specs.

21 Another minor adjustment that can be made again
22 to bring it back into specs is through small changes
23 to the tobacco weight.

24 Q. Now to go on to the point you were talking
25 about, the fact of the matter is you do have the

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1 technical capabilities, if you so chose, to
2 independently manipulate nicotine and tar ratios
3 independent of each other -- or strike -- to
4 independently manipulate tar and nicotine? That is,
5 you can manipulate those two independent of each
6 other; correct?

7 MR. PLESEC: Objection.

8 A. It is technically possible to alter
9 tar-to-nicotine ratio.

10 Q. That is, you've got the ability to decouple
11 nicotine from tar and to adjust tar independent of
12 nicotine -- and adjust nicotine independent of tar;
13 correct?

14 MR. PLESEC: Objection.

15 A. Of course. I've said that that's technically
16 possible, to change the tar-to-nicotine ratio. It's
17 extremely difficult to change tar given a certain
18 tobacco weight. Nicotine can be reduced; it could be
19 increased. The tar-to-nicotine ratio can be
20 changed.

21 Q. In fact, nicotine could be eliminated; correct?

22 MR. PLESEC: Objection.

23 A. Well I'm not sure that nicotine could be
24 eliminated entirely. I think it could be reduced to
25 very low -- very, very low levels.

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1 Q. And R.J. Reynolds has never marketed a product
2 with very, very low levels of nicotine; correct?

3 MR. PLESEC: Objection.

4 A. That's not correct.

5 Q. What's the lowest level of nicotine in a
6 commercial product that RJR has marketed?

7 A. There's a Now box 85 product that has less than
8 .05 milligrams per cigarette by FTC.

9 Q. When was that marketed?

10 A. That was marketed beginning in the early '80s, I
11 believe.

12 Q. You could take the nicotine even lower;
13 correct?

14 MR. PLESEC: Objection.

15 A. Through processing the tobacco to try to remove
16 nicotine, we probably could take the number lower. I
17 think that number is so low it's difficult to measure
18 by FTC methodology. I think what -- what I will make
19 clear is that we probably could make it lower. I
20 don't think you can completely eliminate nicotine.

21 There's always going to be some -- some there if
22 you -- if you look hard enough.

23 Q. Has RJR -- R ever marketed a cigarette in which
24 nicotine is virtually eliminated?

25 MR. PLESEC: Objection.

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1 A. By "virtually eliminated," do you mean virtually
2 eliminated from the tobacco blend or do --

3 Q. Virtually eliminated from the smoke.

4 A. -- you mean -- are you speaking to the smoke?

5 Q. Well the smoke. I mean, what you -- what you
6 get is the smoke; right? You don't eat the
7 cigarette. You smoke it; right?

8 A. Well see, by -- by your questions speaking to
9 virtual elimination of nicotine, the Now products
10 have very, very low levels and I said that they're so
11 low that they're even difficult to measure.

12 Q. I said "virtually eliminated."

13 A. Well that's a qualitative term. Can you be more
14 specific?

15 Q. Certainly. Do you understand that Philip Morris
16 at one point commercialized a product that virtually
17 eliminated nicotine?

18 A. Are you --

19 MR. PLESEC: Objection.

20 A. Are you aware that those products had higher
21 yields than the Now product I was just speaking to,
22 higher nicotine yields? They were rated at .1
23 milligrams cig -- per cigarette.

24 Q. And what cigarette was that, sir?

25 A. They had a series of cigarettes from Philip

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1 Morris all at about .1 milligrams per -- per
2 cigarette nicotine. They ranged in tar yields from
3 about 8 to about 12 or so. There was Merit denic. A
4 Next was another brand, and there were multiple brand
5 styles. It was also incorporated in Benson & Hedges
6 and several brand styles.

7 There were as many as 16 or 18 different brand
8 styles on the market by Philip Morris, all of which
9 were rated by the FTC as higher nicotine levels than
10 that particular Now product we just spoke to. They
11 were the same nicotine level as the mainstream Now
12 products, Now -- Now 85, which was rated at .1
13 milligrams per cigarette. They did it in different
14 ways.

15 Q. Can nicotine be virtually eliminated from
16 cigarette smoke?

17 MR. PLESEC: Objection.

18 A. I -- I need that to be asked in a -- in a more
19 specific way. "Virtually eliminated" is -- is
20 qualitative.

21 Q. Can it be eliminated?

22 A. Completely?

23 Q. Yeah.

24 A. I don't believe so. I think as long as tobacco
25 is burned, I think, and as long as you have sensitive

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1 analytical techniques, you'll always find some trace
2 of nicotine.

3 Q. How long was the Now product that you were
4 talking about on the market?

5 MR. PLESEC: Objection.

6 A. Now as a brand was -- was --

7 Q. No, the product you were talking about, sir.

8 A. I think I testified earlier that it began in
9 early ninety -- 1980s.

10 Q. How long was it on the market?

11 A. It's still on the market.

12 Q. Okay. The one with .05?

13 A. .05. It's still a product that we manufacture
14 and sell. We don't sell many of them. We sell more
15 of the Now products that are rated at .1 milligrams
16 per cigarette, and that includes a number of -- a
17 number of styles, like Now box -- I'm sorry, Now soft
18 pack 85 and a number of others.

19 Q. Is Now considered an ultralow-tar product by
20 R.J. Reynolds?

21 A. Yes.

22 Q. So if I see a designation "ULT," Now would fall
23 into that "ULT" designation?

24 A. That's correct.

25 Q. I believe in your testimony in the Raulerson

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1 case you talked about in the context of select --
2 selective reduction about the first substance that
3 R.J. Reynolds tried to remove was benzopyrene.

4 Correct?

5 A. That's correct.

6 Q. Is it your understanding that benzopyrene was
7 first identified and publicized as a component of
8 cigarette smoke in the early 1950s?

9 MR. PLESEC: Objection.

10 A. No, I believe that the focus on cigarette smoke
11 vis-a-vis benzopyrene began in the early '50s. I
12 think there was speculation that benzopyrene might be
13 present in cigarette smoke that may have preceded
14 that.

15 Q. Okay. But when was it first publicized that
16 benzopyrene was a compound present in cigarette
17 smoke?

18 A. When was it first identified in cigarette
19 smoke? Is that your question?

20 Q. Well that's not the question I asked, so why
21 don't you answer the question I asked.

22 A. Well, then please read it again.

23 Q. When was it first publicized that benzopyrene
24 was a compound present in cigarette smoke?

25 MR. PLESEC: Objection.

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1 A. What do you mean "publicized"?

2 Q. Became public knowledge, became publicly
3 recognized.

4 A. Outside of the scientific community?

5 Q. Well in -- in the larger community. Do you
6 recall when it became recognized in the larger
7 community that benzopyrene --

8 A. What is -- what is the larger community?

9 Q. Well the community that the rest of us live in.

10 A. So you mean the public arena?

11 Q. That's what "publicized" usually means.

12 MR. PLESEC: Objection.

13 A. I'm just trying to ask for a clarification.

14 Okay?

15 Q. When did the public first became aware on a
16 broad basis that benzopyrene was a component of
17 cigarette smoke?

18 MR. PLESEC: Objection.

19 A. I don't know the extent of public awareness of
20 this scientific issue or any scientific issues. I do
21 know that there was some publicity about it in -- in
22 the public media; for example, Reader's Digest.

23 There was a couple articles about benzopyrene and
24 other possible constituents in cigarette smoke in the
25 '50s.

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1 Q. Right. In about 1953; correct?

2 MR. PLESEC: Objection.

3 A. I can recall one in 1957, I think.

4 Q. Do you recall anything in 1953, a report by
5 Wynder and his group that identified benzopyrene in
6 cigarette smoke? Do you recall that?

7 MR. PLESEC: Objection.

8 A. I don't think it was '53. I think it was '55,
9 wasn't it? Wynder did publish the -- the
10 identification of benzopyrene in cigarette smoke.

11 Q. Do you know what the reaction of the cigarette
12 industry was to the publication of the fact that
13 benzopyrene, a known carcinogen, might be present in
14 cigarette smoke?

15 MR. PLESEC: Objection.

16 A. I can tell you what I've surmised is the
17 reaction of Reynolds.

18 Q. Okay. Why don't you do that.

19 A. I think when it was speculated that benzopyrene
20 might be a constituent in cigarette smoke, because
21 it's a combustion system and because it was thought
22 that benzopyrene is formed in combustion systems,
23 like diesel exhaust and other things, that we set out
24 to first of all determine if benzopyrene was present
25 in cigarette smoke, and we went through extensive

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1 analytical techniques and did in fact identify and
2 crystallize benzopyrene, which is something Professor
3 Wynder didn't do. We physically had it in
4 crystalline form.

5 We also determined the levels of benzopyrene
6 that were present in cigarette smoke, and we tried to
7 figure out ways to reduce or eliminate benzopyrene.

8 Q. You would agree, wouldn't you, that before
9 undertaking any of that research on benzopyrene, it
10 would have been inappropriate for R.J. Reynolds to
11 make public statements that its cigarettes were not
12 injurious to health; correct?

13 MR. PLESEC: Objection.

14 A. I don't know whether -- I mean, I don't know
15 whether that would be appropriate or not. You know,
16 all I'm doing is -- is trying to give you some idea
17 of what we did from a scientific point of view.

18 Q. But I'm asking you as a company wouldn't it be
19 inappropriate to come out and say that a product is
20 not injurious to health when in fact you haven't done
21 any research one way or the other about that
22 product?

23 MR. PLESEC: Objection, mischaracterization
24 of the testimony.

25 A. No, I don't think that's fair.

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1 Q. Okay. Do you think that it would be
2 inappropriate for a company to come out and say that
3 your product is not injurious to health when in fact
4 your own scientists had concluded from a review of
5 clinical data that the clinical data tended to
6 confirm the relationship between heavy and prolonged
7 tobacco smoking and the incidence of lung cancer?

8 MR. PLESEC: Objection.

9 A. You know, I can only guess what the
10 circumstances might be about -- around all of that,
11 and I know that the -- the epidemiology, the mouse
12 skin painting were all new on the table in the early
13 '50s. I think it was -- it was just becoming -- as
14 Reynolds researchers were evaluating the literature
15 and talking to -- to a variety of -- of people in the
16 scientific community, I think it was emerging that
17 cigarette smoking clearly is a risk.

18 I can't -- I can't really defend or attack the
19 notion of -- of a statement like that in that -- in
20 that very fast changing time period.

21 Q. Well isn't it true that as of 1953 there were at
22 least 78 articles in the literature or available that
23 discussed or analyzed whether or not cigarette smoke
24 or constituents in cigarette smoke caused cancer?

25 MR. PLESEC: Objection.

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1 A. That number may well be right. I don't know.

2 Q. And if an RJR scientist reviewed those

3 78 studies and stated that that clinical data tended

4 to confirm the relationship between heavy and

5 prolonged tobacco smoking and the incidence of

6 cancer, don't you think it would be inappropriate for

7 his company to then take out an advertisement and

8 publish it in 448 newspapers throughout the country

9 stating that "Our products are not injurious to

10 health"?

11 MR. PLESEC: Objection, lack of foundation,
12 argumentative.

13 A. Again -- again I don't know the circumstances
14 around that. I know that the science was emerging.
15 I know we looked at the science closely because I can
16 see the same reports in our R&D library that you
17 have. I just don't know the circumstances around
18 that statement.

19 Q. And the fact of the matter is that prior to 1953
20 Reynolds had done no internal studies on whether or
21 not cigarette smoke caused cancer; correct?

22 MR. PLESEC: Objection.

23 A. Prior to 1953?

24 Q. Yes.

25 A. Internal studies?

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1 Q. Yes.

2 A. I'm not aware of any.

3 Q. All right. In fact, Reynolds didn't undertake
4 any biological testing until the mid-'60s; right?

5 MR. PLESEC: Objection.

6 A. It was in the '60s, I recall, the biological
7 research division was formed. I do know that R.J.
8 Reynolds' scientists worked with outside scientists
9 over the period of the '50s to '60s as well.

10 Q. Okay. Wouldn't you agree that it's
11 irresponsible for a company to say that its products
12 are not injurious to health when its own scientists
13 have done research, at least reviewed the published
14 literature, and concluded otherwise and the company
15 itself has done no testing?

16 MR. PLESEC: Objection, lack of foundation,
17 assumes facts not in evidence, --

18 A. Again I --

19 MR. PLESEC: -- argumentative.

20 A. Again I can't speculate on -- on this because I
21 don't know all the circumstances around it. I do
22 believe that at that period of time, in the early
23 '50s, the science was just formulating. You know,
24 the epidemiology was coming to the front. The skin
25 painting had finally been successful after many, many

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1 tries. I think scientists were just coming around to
2 it.

3 I can't speculate on a statement like that,
4 though, not knowing the circumstances around it.

5 Q. Well if there are 78 studies available in 1953
6 for review, that's not exactly the tip of the
7 iceberg? I mean, that's not exactly the start of a
8 research endeavor; correct?

9 MR. PLESEC: Objection, argumentative, lack
10 of foundation, lack of facts in evidence.

11 MR. O'FALLON: Don't worry, they'll all be
12 in evidence.

13 A. Well I -- I'm -- can you ask that again? I'm
14 not sure I understand what you --

15 Q. Well if there are 78 studies available in 1953
16 for review, that's not exactly the start of a
17 research endeavor; correct?

18 A. I think the science was just getting on the
19 table in the early '50s. Obviously today there's
20 tens of thousands, so I -- it may well be the tip of
21 the iceberg.

22 Q. Well 40 years later there's tens of thousands of
23 studies; correct?

24 A. I would say that's my -- my estimate, not having
25 gone out and reviewed the literature.

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1 Q. The vast, vast majority of those studies
2 conclude that cigarette smoke in fact causes disease;
3 correct?

4 MR. PLESEC: Objection.

5 A. I think most people in this country have made
6 that conclusion.

7 Q. I'm really asking for your conclusion, sir.

8 A. No, that -- can you read that back because
9 that's not what I heard.

10 Q. The vast, vast majority of those studies
11 conclude that cigarette smoke in fact causes disease;
12 correct?

13 MR. PLESEC: Same objection.

14 A. And again, most people in this country have
15 concluded that.

16 Q. But you have not?

17 A. I don't know whether cigarette smoking causes
18 those diseases. As I said before, it may. It is
19 very certainly and definitely a risk for those
20 diseases.

21 Q. And when I say "you," it's not just you that --
22 that do not accept that fact. It's also your
23 company; correct? Your company doesn't accept that
24 cigarette smoke causes disease; correct?

25 MR. PLESEC: Objection.

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1 A. In the answer to the earlier question, I was
2 speaking for me personally.

3 Q. Yeah, and --

4 A. I believe --

5 Q. -- now I'm asking you about your company.

6 A. I believe my company, based on the science, also
7 takes the same position.

8 Q. And in fact, there's a number of internal
9 documents that lay out that position; correct?

10 MR. PLESEC: Objection.

11 A. I don't know of internal documents that lay out
12 any specific position on that. I know that there's a
13 number of individual scientific documents that speak
14 to various aspects of causation.

15 Q. You haven't seen any internal documents as to
16 the company's position on causation?

17 MR. PLESEC: Objection.

18 A. I've never seen a company document or a document
19 that -- that outlines the company's position on
20 causation that I can recall. I really can't.

21 Q. I'm going to show you a document that's been
22 previously marked as Plaintiffs' Exhibit 1148. Have
23 you seen this document previously?

24 A. Yes, I have. It's been a while.

25 Q. This document is entitled "A Frank Statement to

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1 Cigarette Smokers," is it not?

2 A. The title of it is "A Frank Statement to

3 Cigarette Smokers."

4 Q. Right. And one of the things this document
5 states is that, quote, if you look down in the first
6 column, the second-to-last sentence -- do you see
7 where I'm at?

8 A. First column, second-to-the-last sentence?

9 Q. Uh-huh.

10 A. Yes.

11 Q. It states that "We believe the products we make
12 are not injurious to health"; correct?

13 A. That's what this --

14 MR. PLESEC: Objection.

15 A. That's what this document says.

16 Q. Okay. And this is a statement that is signed
17 and was published by, among others, your company;
18 correct?

19 A. That's --

20 MR. PLESEC: Objection.

21 A. That's correct.

22 Q. It says at the bottom "SPONSORS"; right?

23 A. That's what -- that's what this document says.

24 Q. And it lists as one of the sponsors of this
25 Frank Statement R.J. Reynolds Tobacco Company;

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1 correct?

2 A. That's what's listed at the bottom.

3 Q. And it says that it's E. A. Darr, President, is
4 the person who has apparently authorized this;

5 correct?

6 MR. PLESEC: Objection.

7 A. That's what it says.

8 Q. Okay. It also states that, quote, "We accept an
9 interest in people's health as a basic
10 responsibility, paramount to every other
11 consideration in our business"; correct?

12 MR. PLESEC: Object. Where are you reading
13 from, Counsel?

14 MR. O'FALLON: The statement right above
15 the one I just read. I'm sorry. It's in the first
16 column. It's the third sentence from the bottom.

17 MR. PLESEC: And your question is?

18 Q. Do you see where I'm at, Dr. Townsend?

19 A. I see it.

20 Q. Okay. And that statement reads as follows:
21 Quote, "We accept an interest in people's health as a
22 basic responsibility, paramount to every other
23 consideration in our business," end quote; correct?

24 A. You read that --

25 MR. PLESEC: Objection.

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1 A. You read that accurately.

2 Q. Okay. Was it your understanding that R.J.

3 Reynolds during the time you've been with the company
4 accepted an interest in people's health as a basic
5 responsibility paramount to every other consideration
6 in their business?

7 MR. PLESEC: Objection.

8 A. Over the 20 years that I've been with Reynolds?

9 Q. Yes.

10 A. That's definitely been my -- my experience at
11 Reynolds. We as scientists have taken these things
12 seriously and we're trying to do something about it.

13 Q. But again your research department has never
14 actually looked at whether or not cigarette smoke
15 does in fact cause disease in human beings; correct?

16 MR. PLESEC: Objection.

17 A. I don't think that's correct at all. We
18 continue to work with scientists around the world to
19 try to understand any roles of cigarette smoking to
20 disease.

21 Q. Internally R.J. Reynolds has never undertaken
22 biological research to determine whether or not
23 cigarette smoking causes disease; is that correct?

24 MR. PLESEC: Objection.

25 A. You mean internally experimentally?

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1 Q. Do you have another definition of "biological
2 research"?

3 A. One can research and thoroughly understand the
4 literature and what's being developed by others in
5 other research laboratories.

6 Q. Okay. And you would agree that that's an
7 appropriate function of a research scientist;
8 correct?

9 MR. PLESEC: Objection.

10 A. To understand the information in the literature
11 and to talk with scientists, yes, absolutely, that's
12 an important function of any R&D organization.

13 Q. And to analyze the information they have
14 available; correct?

15 A. And to analyze the information that's available
16 from -- from the literature and also from discussions
17 with scientists.

18 Q. So for instance, when Dr. Teague in 1953 set out
19 to analyze the literature concerning cigarette
20 smoking and cancer, that was a valid scientific and
21 R&D function that he was performing at that time;
22 correct?

23 MR. PLESEC: Objection.

24 A. It is important to know what's in the literature
25 or to know what other people are doing and have found

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1 out, so a survey of the literature such as Dr. Teague
2 conducted is an essential part of our R&D effort.

3 Q. So let me rephrase my question given that
4 understanding.

5 Internally R.J. Reynolds has never undertaken
6 ex -- undertaken experimental biological research to
7 determine whether or not cigarette smoking causes
8 disease; is that correct?

9 MR. PLESEC: Objection.

10 A. To my knowledge, we have not conducted research
11 to understand in animal systems causation in -- in
12 that way. We have tried to understand molecular
13 basis of disease and how cigarette smoking may be
14 involved in it.

15 The whole notion of med -- of -- of medical or
16 biological research aimed at causation is so broad
17 and I'm struggling with it frankly because there are
18 basic experiments like the DNA adduct formation we
19 were talking about earlier I think could factor into
20 our understanding of disease and cigarettes' role or
21 possible role in disease. So it's hard for me to --
22 to narrow it down and say definitively "yes" or "no"
23 because of the broad nature of that.

24 Q. At --

25 A. We've conducted a lot of biological research.

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1 We've also contracted a lot of biological research.

2 Q. At any time while you've been with the company,
3 have they had a medical doctor on their research
4 staff?

5 MR. PLESEC: Objection.

6 MR. O'FALLON: What's your basis?

7 MR. PLESEC: At any time?

8 MR. O'FALLON: At any time while you have
9 been with the company, have they had a medical doctor
10 on their research staff, that's my question. Now
11 what's your objection to it?

12 MR. PLESEC: Well anytime that he's been on
13 the --

14 MR. O'FALLON: Could that be any clearer?

15 I mean, what's your objection?

16 MR. PLESEC: The question is anytime that
17 he's been on the research staff?

18 MR. O'FALLON: What's the objection that
19 you have to my question?

20 MR. PLESEC: Well, you can answer the
21 question.

22 MR. O'FALLON: Well I know he can. I'm
23 asking you what your objection is. I'm entitled to
24 ask so I can --

25 MR. PLESEC: I misunderstood the question.

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1 I thought you said at any time did R.J. Reynolds have
2 a medical doctor on its staff.

3 MR. O'FALLON: Okay. Well let's go back
4 then and reread the question. I understand you're
5 withdrawing your objection.

6 MR. PLESEC: Withdrawing.

7 BY MR. O'FALLON:

8 Q. My question was: At any time while you have
9 been with the company, have they had a medical doctor
10 on their research staff?

11 A. Yes.

12 Q. And who was that medical doctor?

13 A. Dr. Carl Ehmann.

14 Q. Excuse me?

15 A. Dr. Carl Ehmann was senior vice president in
16 charge of research and development.

17 Q. And how long was he with the company?

18 A. I think maybe three years.

19 Q. During what time period?

20 A. '93 to '96 approximately.

21 Q. During that time period, did he participate in
22 any research?

23 A. As senior vice president of research and
24 development?

25 Q. Yeah.

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1 A. He was responsible for the research and
2 development department, guided that department. He
3 specifically didn't go in the lab and do research if
4 that's what you mean.

5 Q. What was his medical specialty?

6 A. Well he had -- actually had broad-based
7 experience. He had experience -- actually he's -- I
8 don't know his entire background. His formal
9 training was in dermatology, I believe. I think he's
10 been involved in research, medical research, because
11 he was head of -- of research and development for
12 a -- a number of large companies, including Johnson &
13 Johnson.

14 Q. Any other medical doctor that's been on the
15 research staff while you've been with the company?

16 A. Not that I can think of.

17 MR. O'FALLON: Do you want to take another
18 quick break?

19 MR. PLESEC: Sure.

20 THE REPORTER: Off the record, please.

21 (Recess taken.)

22 BY MR. O'FALLON:

23 Q. I'd like to go back for a second to your earlier
24 testimony concerning carbon monoxide. I believe it
25 was your testimony that RJR did not do testing with

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1 carbon monoxide to see whether or not carbon monoxide
2 actually caused the problems that had been associated
3 with it. Correct?

4 MR. PLESEC: Objection.

5 A. Well that may be an oversimplification. You
6 know, we certainly have tried to understand the
7 literature on -- on the effects of carbon monoxide.
8 We also have done some measures, particularly for
9 Premier development, looking at carboxyhemoglobin
10 levels in smokers, trying to understand how smoking
11 one product versus another product may reduce it.

12 We've also for some of the low-CO prototypes
13 done hem -- carboxyhemoglobin measurements in smoker
14 groups, a smoker group and a control group, to see if
15 reduced CO levels in smoke translate to a reduced
16 carboxyhemoglobin level.

17 Q. But don't you have to take that research to the
18 next step; that is, that once you determine that you
19 can reduce the carbon monoxide, don't you then have
20 to take it to the next step to see whether reduced
21 carbon monoxide actually has any effect inside the
22 human body; that is, whether or not that will
23 actually then alleviate whatever disease it's
24 associated with?

25 MR. PLESEC: Objection.

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1 A. I think I just exactly spoke to that by telling
2 you that for some of the low-CO prototypes we
3 measured carboxyhemoglobin levels --

4 Q. Okay.

5 A. -- to see whether that translates to a
6 difference in the serum.

7 Q. Okay. But did you determine before that time
8 that it was these differences, these elevations in
9 carboxyhemoglobin, that in fact cause disease?

10 MR. PLESEC: Objection.

11 A. I really don't know. This is outside of my
12 area. I do know that we've looked at the
13 literature. We've talked to scientists. We've tried
14 to understand the effects of carby -- carbon monoxide
15 exposure at levels that are typical of cigarettes.

16 Q. Okay.

17 A. I don't know to what extent that causes
18 disease. I don't know.

19 Q. Well but that's what I'm -- that's really what
20 I'm asking you, is without knowing what it is about
21 the carbon monoxide that causes disease, how do you
22 know what endpoint you should shoot for? For
23 instance, without knowing that it's an elevated level
24 of carboxyhemoglobin that causes the problems, you
25 know, why would you shoot for a lower level?

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1 MR. PLESEC: Objection.

2 A. I'm certain that there are people at Reynolds
3 who are far -- far more knowledgeable than me about
4 this; for example, Dr. Simmons and others, because
5 they're -- they're biochemists or biologists or
6 toxicologists and they understand this; I don't.

7 From a cigarette design perspective, we look at those
8 constituents in smoke that we think might be a
9 problem and we try to reduce or eliminate it.

10 Q. Well --

11 A. You know, and I've just -- I've -- I've just
12 explained to you how we've evaluated one of our
13 prototypes or actually several of our prototypes with
14 smokers measuring carboxyhemoglobin levels. The
15 biological implications of that is beyond me.

16 Q. Well but are they beyond Reynolds I guess is
17 what I'm asking because again it would strike me that
18 before you go and design a cigarette that delivers
19 lower carbon monoxide, you have to know whether or
20 not it's lower carbon monoxide or higher carbon
21 monoxide that is in fact the problem with carbon
22 monoxide as it relates to the cigarette; right?

23 A. Well I'm --

24 MR. PLESEC: Objection. The witness has
25 already told you he's outside his area of expertise.

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1 You've had other witnesses from Reynolds who are more
2 expert on these subjects. Do we have to pursue these
3 questions?

4 MR. O'FALLON: Well, sir, I'm -- I'm going
5 to. Now if you don't want to and if you want to call
6 the judge, we can certainly do that.

7 MR. PLESEC: We'll do that over the lunch
8 hour.

9 A. I'm glad you clarified that in that last
10 question because my interpretation of your questions
11 to me was what do I know personally. Then you've
12 in -- in the last statement broadened that to say
13 well does anybody know at Reynolds or does Reynolds
14 know that. And I think the answer is yes, people at
15 Reynolds do understand these sorts of things. I'm
16 telling you I'm a physical organic chemist. I
17 don't.

18 Q. Okay. But when you do cigarette design,
19 certainly you have interactions with those people
20 throughout the company? I mean, this is an overall
21 effort, and -- and cigarette design is simply one
22 part of that effort; correct?

23 A. Cigarette design is one part of our overall
24 attempts at product development and marketing new
25 products that have certain differences.

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1 Q. Okay. Well let me -- let me see if I can just
2 broaden this out a bit, and maybe we can address your
3 counsel's concerns and maybe you can address my
4 concerns at the same time.

5 Is it my understanding that you have no
6 expertise on whether or not the designs that you
7 implement actually do have any beneficial biological
8 effect?

9 MR. PLESEC: Objection.

10 A. Let me try to explain to you what I think, and I
11 think that will answer your question very clearly.

12 In the end in a complex mixture like cigarette
13 smoke, there's no way to prove, I don't believe,
14 whether one particular product is safer than another
15 or better than another in any kind of health
16 aspects. There's no way to prove that. You can see
17 biological assay differences. You can see chemistry
18 differences, and in this kind of complex mixture,
19 there's no way of measuring or determining whether a
20 reduction in particular constituents or a reduction
21 in particular biological tests in fact will mean that
22 that product is safer than another.

23 It ought to be. It ought to be from common
24 sense, and this is a nonexpert talking. If you
25 reduce chemistry and you reduce a number of

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1 biological assays, not just one or two, and you
2 reduce a number of mainstream smoke constituents, not
3 just one or two, there's every reason to think that
4 should be better.

5 Q. Well --

6 A. But there's no way to prove it.

7 Q. -- that's not really my -- my question, and, you
8 know, your -- your counsel has objected to me asking
9 you questions that go into biological research
10 because it's outside your area of expertise, and what
11 I'm trying to determine is whether or not at trial
12 you are going to be opining on whether or not, for
13 instance, the removal of benzopyrene did or did not
14 have any beneficial biological effect.

15 If that's outside your area of expertise and
16 alls you can say is, "We tried to remove
17 benzopyrene. I don't know whether that was a good or
18 a bad thing to do. Alls I know is I was told to do
19 it and I did it," if that's your testimony, fine;
20 then I won't have to waste time on whether or not
21 you're actually going to talk about then what the
22 effects of removal of these constituents are.

23 A. On health.

24 Q. But if in fact -- yes, on health or on the
25 biology of an animal or on the cellular matrix in an

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1 Ames test or anything like that. If you're not going
2 to testify about that and if that's not your
3 expertise, then I won't ask you about those areas.
4 But if in fact you are going to give opinions that
5 impinge on that area, then I'm going to explore your
6 opinions and I'm going to determine the bases of your
7 opinions and the full breadth of your knowledge.

8 Okay?

9 A. Okay. Well --

10 Q. So --

11 A. -- let me -- let me help you then.

12 Q. Okay. With that in mind.

13 A. I think -- I think it's certain that if I go
14 to -- to this particular trial, I will testify on
15 R.J. Reynolds' efforts to reduce or eliminate a
16 number of mainstream constituents, including
17 benzopyrene, as you're using for -- as an example. I
18 will certainly speak to -- to chemistry reductions.
19 I certainly will speak to some biology reductions,
20 but I cannot interpret what those bio -- biological
21 changes or chemistry changes even mean to human
22 health.

23 Q. Okay. But you are going to talk about
24 biological reductions?

25 A. I will talk about biological reductions because

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1 biology is one measure of progress. There's no way
2 to define that that progress translates directly into
3 human health because, as I testified just a minute
4 ago, there's no way to prove one cigarette is better
5 than another.

6 Q. Okay.

7 A. But I will testify that as using biological
8 tests as endpoints to try to measure progress in
9 cigarette design, that we've done that and we've had
10 a number of differences, and I will document those
11 differences.

12 Q. Okay. So you will be talking about the results
13 of biological tests?

14 A. I will be talking about the results of some
15 biological tests used as measures of possible
16 progress in cigarette design.

17 Q. Okay.

18 A. Without interpretation as to their meaning on
19 human health because I have no idea.

20 MR. O'FALLON: Okay. Well if you're going
21 to be talking about the results of biological tests,
22 then, Counsel, I believe I have the right to
23 determine not only what biological tests were done,
24 but maybe more importantly what biological tests were
25 not done in order to be able to impeach the testimony

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1 he's going to give, so that's going to be my position
2 on that issue.

3 MR. PLESEC: Okay. Your position is
4 clear.

5 MR. O'FALLON: And I think I've now laid
6 adequate foundation to do that.

7 BY MR. O'FALLON:

8 Q. And again, since you are going to be talking
9 about biological tests, I'm going to go back and pick
10 up where I left off. That is, wouldn't you agree
11 with me that until you know what endpoints you need
12 to hit; that is, what it is about, for instance,
13 carbon monoxide that causes problems in humans or
14 animals, it's very hard to know what biological
15 endpoints you should be testing for?

16 MR. PLESEC: Objection.

17 A. I'm not an expert in this area. I don't lay out
18 a protocol for biological testing; our experts do
19 that. You know, what you suggested I think in -- in
20 one sense is -- is -- makes sense to me in terms of
21 you -- you need to know or I think you need to
22 understand what possible biological implications of
23 one particular constituent are to make sure you're
24 using the right biological assays.

25 That's my interpretation of -- of what you just

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1 said. It's what I will agree to.

2 Q. Okay. And you will agree then that, for
3 instance, with carbon monoxide --

4 MR. PLESEC: Excuse me.

5 MR. O'FALLON: Oh, I'm sorry.

6 MR. PLESEC: Were you finished with your
7 answer?

8 Q. I'm sorry. Were you done?

9 A. Yeah, I think so.

10 Q. Well I didn't mean to interrupt. I thought you
11 were done.

12 A. I -- I started to say something else, but it was
13 just --

14 Q. Go ahead.

15 A. -- more of the same. It wasn't adding anything
16 new.

17 Q. Well I didn't mean to interrupt, so if you've
18 got more to say, go ahead.

19 A. I'm finished.

20 Q. Okay. So going back to our example of carbon
21 monoxide, in order to know whether or not, for
22 instance, a reduction in the carbon monoxide level in
23 the blood is significant, you have to first have a
24 reasonable understanding that it is in fact an
25 elevated carbon monoxide level in the blood that is

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1 causing some damage; correct?

2 MR. PLESEC: Objection.

3 A. That is causing some damage?

4 Q. I'm trying to stay inside your expertise and not
5 wander outside your expertise.

6 A. Well let me -- let me then very well define the
7 limits of my expertise on this -- this example then.

8 Cigarette smoking we've shown at Reynolds will
9 somewhat increase carboxyhemoglobin levels. The
10 low -- some low-CO prototypes we've also shown will
11 result in less of an increase in carboxyhemoglobin
12 levels in blood compared to some control at equal tar
13 level.

14 The overall implication of any particular level
15 of carboxyhemoglobin or any particular reduction of
16 level in carboxyhemoglobin is something I cannot
17 speak to at all, the health effects of any particular
18 level in any particular assay or measure. As a
19 product developer, I'm telling you, though, that our
20 charge is to try to reduce constituents that are
21 thought to be a problem. Carbon monoxide is one of
22 those. Through cigarette design efforts, we've made
23 some reductions.

24 That's it. And we use certain biological
25 measures; in -- in this example, serum

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1 carboxyhemoglobin levels, to determine whether we've
2 made a difference. That's all.

3 Q. To the best of your knowledge, have -- has R.J.
4 Reynolds ever done research to determine whether
5 elevated CO₂ levels in the blood is harmful?

6 MR. PLESEC: Objection.

7 A. Elevated CO₂ levels?

8 Q. Yeah. And I'm saying that just because I have a
9 hard time pronouncing the word that you're using.

10 Carbo -- what is it, carbo -- how --

11 A. CO₂ is carbon dioxide.

12 Q. I'm -- I'm talking about CO levels. I'm sorry.

13 What's the word you've been using, "carbo" --

14 A. "Carbon" -- "carbon monoxide."

15 Q. Yeah, but "carbohemoglobin"?

16 A. "Carboxyhemoglobin."

17 Q. Which is the measure of CO in the blood; right?

18 A. It's the complex between CO and the heme
19 molecule, which is the molecule that carries oxygen
20 in the blood.

21 Q. Okay. Has R.J. Reynolds, to the best of your
22 knowledge, done research to determine the effects of
23 elevated carboxyhemoglobin in an animal model?

24 A. I can't exactly answer that in an animal model.
25 I know that R.J. Reynolds has looked at the

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1 literature. We've talked to a number of people, and
2 I don't know to what extent we may or may not have
3 done experiments to try to relate certain levels to
4 health issues or to health. I don't know.

5 Q. Much of your expert report deals with what I
6 believe you've termed the selective reduction of
7 compounds from cigarette smoke; correct?

8 A. That's correct. That's a lot of the -- the
9 expert report.

10 Q. Okay. And specifically, I believe it's your
11 testimony that you have never been able to identify a
12 silver bullet; that is, one substance that could be
13 removed that would solve all the problems; correct?

14 A. I --

15 MR. PLESEC: Objection.

16 A. I don't think that's an accurate
17 characterization. The term "silver bullet" was meant
18 to refer to the scientific community's approach to
19 reducing the -- the risks of smoking. Many
20 scientists have looked at one compound or one class
21 of compounds and suggested that that is the reason in
22 this very complex mixture that cigarette smoking is a
23 risk.

24 So my term is "silver bullet," meaning that
25 approach as opposed to looking at multiple

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1 constituents or multiple compounds in that complex
2 mixture.

3 Q. Well let's talk about that for a second because
4 isn't it a fact that what the scientific community
5 first did was test the whole smoke and determine that
6 it in fact was tumorigenic?

7 MR. PLESEC: Objection.

8 A. Are you talking about the Wynder study?

9 Q. In part, yes.

10 A. That is a -- that is a condensate experiment,
11 not a whole smoke.

12 Q. Well smoke condensate. Why don't you --

13 A. So it's a smoke condensate that's collected and
14 then painted onto the back of mice and -- and
15 tumorigenicity is measured. But it's not a
16 whole-smoke measure. It's only a condensate
17 measure.

18 Q. Okay. Now does that differ from the mouse skin
19 painting that you do at R.J. Reynolds today?

20 A. No, we still use condensate.

21 Q. Okay. So you're --

22 A. I don't -- I don't know of any way to get
23 whole-smoke exposure in this kind of long-term
24 tumorigenicity test.

25 Q. Okay. So I misspoke. The first thing that the

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1 scientific community really tested was smoke
2 condensate; that is, what's generically referred to
3 as tar; correct?

4 MR. PLESEC: Objection.

5 A. In a generic way, that's -- that's -- that's
6 been referred to as tar.

7 Q. Right. So they took smoke condensate from
8 cigarettes that had been smoked and took that
9 condensate and painted it upon the skin of mice;
10 correct?

11 A. Again I'm not an expert in the area, but I would
12 say they painted smoke condensate on the -- on the
13 skin of mice at different levels.

14 Q. And that produced tumors; correct?

15 A. That produced excess tumors compared to some
16 control.

17 Q. And that's what first led them to have some real
18 concern, that as well as the epidemiology; that is,
19 the human evidence that indicated that smokers had a
20 much higher risk for lung cancer; correct?

21 MR. PLESEC: Objection.

22 A. I don't understand your question that's what
23 made them have a concern.

24 Q. Well --

25 A. I don't understand who "them" is and --

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1 Q. Well let's go back and I'll rephrase then.

2 The scientific community became concerned
3 because they saw that when you put smoke condensate
4 on the skin of animals, you produced more tumors than
5 you would expect, and then they took that evidence
6 and also the evidence that was in the epidemiology on
7 the human animal; that was, that in the human animal
8 smokers appeared to have a much elevated level of
9 lung cancer as compared to nonsmokers. They took
10 those two pieces of information together and came to
11 certain conclusions that they believed tobacco smoke
12 caused lung cancer or disease; correct?

13 MR. PLESEC: Objection.

14 A. I think many people have taken the epidemiology
15 in itself and jumped to the conclusion that cigarette
16 smoking causes lung cancer based on -- on the epi
17 results. Some people have taken the epi results
18 together with the mouse skin painting results and
19 jumped to the conclusion that cigarette smoking
20 causes lung cancer.

21 Q. But my point is: This was the first steps that
22 were taken; that is, the epidemiology and the smoke
23 condensate mouse skin painting? Those were the first
24 steps the scientific community took; correct?

25 MR. PLESEC: Objection.

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1 A. I don't know that they were the first steps. I
2 think they were two successful pieces of work that
3 were published at about the same time that in one
4 case linked cigarette smoking with lung cancer, in
5 another case showed that in this -- in this
6 laboratory experiment with mice and under the
7 conditions of that experiment, you could produce
8 excess tumors.

9 Q. Science then expanded upon those findings and
10 said, "What is it? Is there one substance or a group
11 of substance or a number of substances in smoke
12 condensate that may be responsible for this increased
13 tumorigenicity that we're seeing in mouse skin
14 painting?" Isn't that true?

15 MR. PLESEC: Objection.

16 A. No, I don't agree with it exactly as you've
17 phrased it. I think science in the early days did
18 look at single compounds or classes of compounds
19 pretty much as potentially the problem.

20 Q. Well --

21 A. I think as toxicology has developed and our
22 understanding of complex mixtures has developed,
23 scientists have gradually understood that there may
24 not be one compound but there may be many compounds
25 or a number of compounds that together may -- you

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1 know, may cause a problem.

2 Q. Well you keep talking in your report about a
3 moving target. Isn't it true that in fact the target
4 didn't move; the target just grew?

5 MR. PLESEC: Objection.

6 Q. I mean, isn't it -- isn't it true that -- that
7 they first identified one substance that they knew
8 was a carcinogen in cigarette smoke and then they
9 kept identifying more and more and more and more
10 substances that were known carcinogens in cigarette
11 smoke to the point where you couldn't remove all of
12 them?

13 MR. PLESEC: Objection.

14 A. I don't think that's accurate at all, huh-uh.
15 Q. Well the first substance that they identified
16 was benzopyrene; correct?

17 A. That's correct.

18 Q. And benzopyrene was a known carcinogen;
19 correct?

20 A. It was believed to be an animal carcinogen
21 because it produced excess tumors in mouse skin
22 painting studies --

23 Q. And you understand --

24 A. -- in a neat -- in a neat fashion.

25 Q. Yeah. And you understand that you don't conduct

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1 experiments on human beings with a suspected
2 carcinogen; correct?

3 A. Oh, that's correct.

4 Q. Because that would be unethical; right?

5 MR. PLESEC: Objection.

6 A. Science does not conduct human experiments.

7 Q. It would be scientifically unethical to do so;
8 correct?

9 A. I would consider it unethical.

10 Q. Right. So that's why you take benzopyrene and
11 you expose an animal to that, and based upon the
12 findings in animals, you decide whether it is or
13 isn't a carcinogen; correct?

14 MR. PLESEC: Objection.

15 A. Based upon a particular laboratory protocol, you
16 would decide that it produces excess tumors or not,
17 and -- and depending on the type of experiment, you
18 may decide that it's an animal carcinogen or it may
19 be suspected to be a human carcinogen. I mean,
20 there's a variety of factors that go into the
21 determination of carcinogenesis, including the level,
22 the type of material that's used, as well as the
23 particular protocol for the experiment.

24 Q. But the only way you're really going to confirm
25 that a substance is a human carcinogen is through

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1 some type of epidemiology because at that point
2 you're not going to, for instance, in the case of
3 benzopyrene intentionally expose a group of human
4 beings to benzopyrene to see if it produces cancer;
5 correct?

6 MR. PLESEC: Objection.

7 A. I'm not an expert in this area. I do know that
8 IARC has divided constituents or a variety of
9 compounds into animal carcinogens and probable human
10 carcinogens. The -- the -- the approach they use in
11 def -- defining certain constituents either as an
12 animal or a suspected human or a proven human
13 carcinogen is something I don't understand.

14 I do know that there's been accidental exposure
15 to some constituents in workplace environments which
16 has led IARC and others to believe that some
17 compounds are proven human carcinogens.

18 Q. Right. And what they basically do when -- when
19 humans are exposed is they do an epidemiological
20 study to see whether that exposure is significant in
21 causing disease; correct?

22 MR. PLESEC: Objection.

23 A. I'm not an epidemiologist. I do know that
24 there's been several cases of workplace exposure to
25 certain compounds where many, if not all, of the

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1 people exposed developed disease.

2 Q. Absolutely, but in order to study that in a
3 scientifically rigorous fashion, what you do is then
4 compare that group of exposed people to a controlled
5 group of nonexposed people and basically conduct an
6 epidemiological evaluation; correct?

7 MR. PLESEC: Objection.

8 A. I'm not an epidemiologist. What you said sounds
9 reasonable.

10 Q. Okay. At least would that be your understanding
11 of how epidemiology works?

12 MR. PLESEC: Objection.

13 A. I think I'm not an epidemiologist. My
14 understanding of how epidemiology -- epidemiology
15 works is that one study's a control group of people,
16 a test group of subjects, and you try to understand
17 everything you can about their life-styles or
18 exposures to other things to eliminate -- eliminate
19 those as confounding factors, and you develop risk
20 factors that estimate the relative risk of disease.

21 Q. And at some point epidemiologists draw causation
22 conclusions; correct?

23 MR. PLESEC: Objection.

24 A. I think some epidemiologists draw causation
25 conclusions. I think many scientists, however,

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1 look -- look at causation with -- as a bigger
2 picture; that epidemiology is only one piece of
3 the -- of the puzzle; that knowing how a particular
4 compound may cause that disease is essential in -- in
5 concluding that it's a causative factor.

6 Q. Okay. Let's go back to the 1950s. In the 1950s
7 we had epidemiology showing that smokers had a higher
8 degree of lung cancer than nonsmokers and we had
9 animal testing that showed that animals exposed to
10 smoke condensate created a higher degree of tumors
11 than those exposed to a control; correct?

12 A. Those were two pieces of information that were
13 on the table.

14 Q. At some point in time, science started looking
15 for individual compounds in the cigarette smoke that
16 may explain why the cigarette smoke was producing
17 these excess tumors in the animals; correct?

18 MR. PLESEC: Objection.

19 A. I believe that -- that a number of scientists
20 had various theories or hypotheses about what in
21 cigarette smoke may be responsible for both the mouse
22 skin painting results or the epi results.

23 Q. And the first substance that caused concern or
24 that was identified as a known carcinogen was
25 benzopyrene; correct?

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1 A. I believe that was the first one that received
2 major attention.

3 Q. Okay. And benzopyrene is part of a chemical
4 group called the polycyclic hydrocarbons; correct?

5 A. That's correct.

6 Q. Now Reynolds undertook testing to determine
7 whether or not benzopyrene was in cigarette smoke;
8 correct?

9 A. We -- we set about trying to identify its
10 presence in cigarette smoke and determining how much
11 was there.

12 Q. And you did in fact identify the presence of
13 benzopyrene in cigarette smoke; correct?

14 A. Yes, we did.

15 Q. Did you ever report in the form of an
16 advertisement like the Frank Statement to the public
17 that you'd now identified benzopyrene, a known
18 carcinogen, in cigarette smoke?

19 MR. PLESEC: Objection.

20 A. You're talking about a public statement?

21 Q. Yes.

22 A. Not that I'm aware of.

23 Q. Once you'd identified benzopyrene in cigarette
24 smoke, it would be reasonable to conclude that there
25 was a good chance that your cigarettes were in fact

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1 injurious to health; correct?

2 MR. PLESEC: Objection.

3 A. No, I don't think that's correct at all. In
4 fact, Wynder a number of years later concluded that
5 there was in -- there wasn't enough benzopyrene in
6 cigarette smoke to in -- by itself account for the
7 skin painting results.

8 Q. And of course we're not talking about just by
9 itself; right?

10 A. What your question was.

11 Q. No, I said once you identified benzopyrene in
12 cigarette smoke, wouldn't it be reasonable to
13 conclude at that point that there was a good chance
14 that your cigarettes were in fact injurious to
15 health.

16 A. And you're specifically focusing on benzopyrene
17 as the reason cigarette -- and to use your words,
18 once you've identified it in cigarette smoke, you
19 need to make a public statement that benzopyrene is
20 there and it -- that's why your cigarettes are
21 injure -- injurious to health. Is that --

22 Q. No, I'm just saying that once you've identified
23 benzopyrene, a known carcinogen, in cigarette smoke,
24 it would no longer be reasonable to stand by the
25 position that your cigarettes are not injurious to

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1 health. Correct?

2 MR. PLESEC: Objection.

3 A. And what I -- and my first response to I think
4 the first version of the question was Professor
5 Wynder even in the late -- the late '50s concluded
6 that there wasn't enough benzopyrene by itself to
7 account for the mouse skin painting numbers.

8 Q. Okay. So what --

9 A. So --

10 Q. But he didn't conclude that smoke condensate was
11 not injurious to health, did he?

12 A. Well of course not.

13 Q. No. What he was saying is that in fact, "Well
14 we still know that smoke causes an excess number of
15 tumors in mouse skin. It just doesn't appear that
16 this one substance is the sole reason for it";
17 correct?

18 A. I think that --

19 MR. PLESEC: Objection.

20 A. I think that's pretty much what he was saying.

21 Q. Right.

22 A. He said something to the effect that there's not
23 enough benzopyrene present in cigarette smoke to
24 account for the skin painting numbers.

25 Q. Right. But he didn't say that benzopyrene

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1 doesn't account for some portion of the skin painting
2 numbers, did he?

3 MR. PLESEC: Objection.

4 A. No, but then he didn't either. He didn't say
5 that as well.

6 Q. I mean, it would be reasonable to conclude that
7 benzopyrene, a known carcinogen, is going to play at
8 least some role in creating some of those excess
9 tumors or perhaps interacting with other carcinogens
10 to create those tumors; correct?

11 MR. PLESEC: Objection.

12 A. I don't recall Wynder saying one way or the
13 other. I do believe, though, Wynder and others
14 looked to cocarcinogens together with benzopyrene or
15 promoters as the next -- the next theory that they
16 placed on the table. So they didn't walk away from
17 benzopyrene as the culprit. They said, "There's not
18 enough there to account for the problem that we see
19 in mouse skin painting results."

20 Q. By itself?

21 A. "There must be something else."

22 Q. Well there --

23 A. "And -- and one other possibility is that there
24 may be other compounds that -- that are cocarcinogens
25 or -- or promoters that together with benzopyrene and

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1 maybe some other polycyclic aromatic hydrocarbons may
2 account for the results."

3 Q. So there --

4 A. So that was the next theory that was placed on
5 the table.

6 Q. Right. So they're expanding. They're expanding
7 the target. They're now saying, "Well we know
8 there's a known carcinogen in cigarette smoke,
9 benzopyrene, but there's got to be some other things
10 in there that are also accounting for this excess
11 tumor," so they're expanding that target out;
12 correct?

13 MR. PLESEC: Objection.

14 A. I think I just explained my view of it in -- in
15 my answers.

16 Q. Do you disagree with my view?

17 A. I think it's sometimes simple -- simplistic, I'm
18 sorry.

19 Q. In any event, by 1959 your own internal
20 laboratories had identified not only benzopyrene, but
21 at least eight polycyclic hydrocarbons that were
22 known to be carcinogenic in animals; correct?

23 MR. PLESEC: Objection.

24 A. I'd have to go back and look at the specific
25 documents, but by the late '50s we had identified I

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1 think -- we had found a large number of polycyclic
2 aromatic hydrocarbons in smoke, along with some of
3 the cocarcinogens that in the late '50s and early
4 '60s were -- were being looked at, some of the
5 phenols and -- and other constituents.

6 Q. So by the late '50s, you knew there were
7 numerous constituents of tobacco smoke that
8 potentially were causing cancer in animals; correct?

9 MR. PLESEC: Objection.

10 A. We knew that there were many polycyclic aromatic
11 hydrocarbons, not just benzopyrene, present in smoke
12 that were thought to be animal carcinogens, and we
13 weren't the only people that knew that. Other people
14 outside the industry knew that as well, scientists
15 from -- from all over.

16 Q. Did you ever take out an advertisement in the
17 public press that told the public that, "We've now
18 identified eight polycyclic hydrocarbons known to be
19 carcinogens and a potential six additional
20 substances, polycyclic hydrocarbons, that may well be
21 carcinogens"? Did you ever take out that ad?

22 A. I'm not --

23 MR. PLESEC: Objection.

24 A. I'm not aware of such a public ad as you
25 suggest. I do know that there was some information

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1 in the literature again back to -- to Reader's
2 Digest, and I believe later on Consumers Union maybe
3 had some statements like that.

4 Q. But you would agree that the public is going to
5 take it more seriously if the cigarette industry,
6 which has so far been denying that their products
7 cause any problems, actually comes out and says, "We,
8 the cigarette industry, have now identified in our
9 products known carcinogens"?

10 MR. PLESEC: Objection.

11 A. The scientists from R.J. Reynolds and other
12 tobacco companies published information like that in
13 the scientific literature. I can't speculate on how
14 the public might react to any kind of public
15 announcement about it or public press release or paid
16 advertisement. I just can't begin to speculate. I
17 do know that some of the information was available in
18 some of the public media, like Reader's Digest.

19 Q. But all of the --

20 A. But I can't speculate on -- on -- on public
21 reaction and public understanding of that kind of
22 information.

23 Q. But R.J. Reynolds did not publish all the
24 information it had on the carcinogenic chemicals that
25 it had identified in cigarette smoke; correct?

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1 MR. PLESEC: Objection.

2 A. We did a lot of work on some constituents and
3 people beat us to the punch publishing some of that.
4 I think I've gone back and looked at a number of
5 constituents, particularly polycyclic aromatic
6 hydrocarbons, and I'm not aware that -- that
7 eventually there was any that we knew about that we
8 didn't publish or present in some way or another to
9 the scientific community.

10 Q. And again, the vast majority of the smoking
11 public is not a member of the scientific community
12 and would not have access, general access, or -- or
13 make available or read the scientific literature;
14 correct?

15 MR. PLESEC: Objection.

16 A. Well, I think this gets back to the earlier
17 question and the earlier answer. You know, I'm not
18 aware of -- of -- of Reynolds making any kind of
19 public announcement about its finding or any of the
20 tobacco companies frankly making public announcement
21 about its findings about specific chemistry in
22 smoke. I don't know whether the -- whether the
23 public could use that information or how they would
24 react to that information. I do know that there was
25 some information out there through, for example, the

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1 Reader's Digest and others.

2 Q. Well you'll agree with me, won't you, that when
3 R.J. Reynolds wanted to tell the public that it did
4 not believe its product was injurious to health, it
5 certainly found a way to make the public aware of
6 that statement? Correct?

7 MR. PLESEC: Objection.

8 A. I think that that statement that you keep coming
9 back to out of the Frank Statement, "We believe the
10 products we make are not injurious to health," let me
11 give you my opinion and I think that will help you, I
12 hope.

13 This statement I think came at a time when the
14 science was emerging, and I can't make any kind of
15 judgment about whether that was the right thing to do
16 or not. I can tell you today that statement cannot
17 be supported and should not be made because we know a
18 lot more today than we did then, additional epi
19 studies, additional studies trying to understand
20 mechanisms of various chronic diseases. We know a
21 lot more about smoke chemistry today, and I don't
22 think R.J. Reynolds could make that or would make
23 that statement today.

24 Q. Has --

25 A. But I'll tell you that in the early '50s things

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1 were different.

2 Q. Has R.J. Reynolds ever retracted that statement,
3 sir?

4 A. I'm not aware of such a case.

5 Q. So R.J. Reynolds, you would agree, certainly
6 could take out an advertisement at any time it chose
7 and said, you know, "We have now concluded that our
8 products are injurious to health"; correct?

9 MR. PLESEC: Objection.

10 A. I don't think our company has concluded that
11 they are. I don't think our company would say
12 they're not. Again, to something I said earlier, you
13 can't prove a negative. It's very clear that
14 cigarette smoking is a risk for a number of diseases,
15 including lung cancer.

16 Q. You can't prove a negative, so it's your
17 testimony that stating that cigarette smoking causes
18 cancer is somehow a negative statement that you have
19 to disprove?

20 A. No, you misunderstand. The statement "We
21 believe the products we make are not injurious to
22 health," you can't ever prove that.

23 Q. So --

24 A. You can't prove that cigarettes are not
25 injurious to health.

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1 Q. So even --

2 A. The only thing you can do is prove that they
3 are.

4 Q. So even in 1954 when that statement was made, it
5 was nonsustainable?

6 MR. PLESEC: Objection.

7 A. From a scientific point of view, I think that's
8 correct.

9 Q. So it was a misleading statement on the very
10 first day it was made?

11 MR. PLESEC: Objection.

12 A. I -- I don't know whether it's misleading or
13 not. I'm just -- I'm telling you as a scientist that
14 one cannot prove a negative. That's all.

15 Q. And as a scientist, you would look at that
16 statement that was made in the Frank Statement that
17 cigarette smoking is not injurious to health and say
18 that is incorrect as a matter of science?

19 MR. PLESEC: Objection. That
20 mischaracterizes the statement.

21 A. I'm saying that one cannot scientifically prove
22 a negative.

23 Q. Okay.

24 A. That's all.

25 Q. But R.J. Reynolds didn't tell the public that

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1 when it took out that advertisement in 1954? R.J.
2 Reynolds didn't say, "Here's a statement we couldn't
3 even prove if we wanted to today"?

4 MR. PLESEC: Objection, mischaracterization
5 of the statement.

6 A. I've told you I don't understand or know the
7 circumstances around this Frank Statement or any
8 piece of that Frank Statement, including that
9 sentence. I don't know the circumstances of it. I'm
10 sitting here in 1997, as you are, trying to guess
11 what may have happened, and I -- I can't.

12 All I can do is look at what's said here and you
13 ask me questions about it and I give you my opinions
14 about it, but looking backwards and trying to guess
15 what the circumstances were, I can't do that.

16 Q. Well but, sir, that's what you're doing on the
17 vast majority of your testimony, is that you're
18 looking backwards and telling me and opining about
19 what was done by RJR historically, including in the
20 1950s when this statement was taken out.

21 MR. PLESEC: Objection, argumentative, lack
22 of foundation, mischaracterizes the evidence and the
23 testimony of the witness.

24 A. My testimony about what happened from the '50s
25 on in terms of cigarette design, smoke constituent

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1 analysis and attempts to reduce -- reduce or
2 eliminate various smoke constituents are based on
3 scientific studies. I'm not trying to guess or
4 interpret something that's very general or
5 qualitative, like these statements are. I'm using
6 science. Every scientist does that.

7 Q. Is the following statement accurate: Quote, "No
8 one has ever been able to identify an ingredient or
9 group of ingredients in cigarette smoke as found in
10 cigarette smoke which causes cancer or any other
11 disease in humans"?

12 MR. PLESEC: Excuse me, Counsel, where are
13 you -- where are you reading? Are you reading from
14 the Frank Statement?

15 Q. Can you answer my question.

16 A. Well you'll have to read that question again.

17 Q. Sure. Is the following statement accurate:
18 Quote, "No one has ever been able to identify an
19 ingredient or group of ingredients in cigarette smoke
20 as found in cigarette smoke which causes cancer or
21 any other disease in humans"?

22 MR. PLESEC: Objection, lack of context,
23 time.

24 A. You're just asking me if I agree to that
25 statement or not?

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1 Q. I asked you whether or not that statement is
2 accurate.

3 A. Okay. All right. Not -- not being able to read
4 it, can you read it to me one more time, please. I'm
5 sorry.

6 MR. PLESEC: Do you have a document,
7 Counsel, that has that statement in it?

8 Q. Do you believe that the following statement is
9 accurate: Quote, "No one has been able to identify
10 an ingredient or group of ingredients in cigarettes
11 as found in cigarette smoke which causes cancer or
12 any other disease in humans"?

13 A. Okay. I think I understand the question. Let
14 me say there's not a -- a simple answer to that. I
15 will tell you that I agree technically that that
16 statement technically is very accurate. I will tell
17 you that -- that there are constituents found in
18 cigarette smoke which at levels higher than those
19 present in cigarette smoke are thought to be
20 carcinogens and even human carcinogens, like benzene,
21 vinyl chloride or cadmium, but at the levels present
22 in cigarette smoke in that particular mixture, it's
23 unclear that they are in fact carcinogenic at that
24 level in those -- in that mixture. They may.

25 Q. You mean singly carcinogenic or taken together

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1 carcinogenic?

2 MR. PLESEC: Objection.

3 A. I'm saying that the levels of the constituents
4 in cigarette smoke are exceedingly low. I think some
5 constituents that are present in cigarette smoke at
6 high levels have shown tumorigenicity or are thought
7 at high levels and -- and -- are thought at high
8 levels to be human carcinogens, like benzene and
9 vinyl chloride or cadmium.

10 But at levels present in cigarette smoke, I
11 don't think there's evidence that those constituents
12 in fact will cause cancer.

13 Q. But that's --

14 A. It may.

15 Q. -- that's looking --

16 A. I don't know.

17 Q. -- at each constituent individually; correct?

18 A. All I was going to was trying to understand that
19 sentence as read to me without being able to look at
20 it and thoroughly understand it and trying to tell
21 you my opinion, and that's my opinion.

22 Q. My follow-up question is: That's looking at
23 each constituent individually; correct?

24 A. I think there's a -- in terms of -- I mean,
25 that's how carcinogenicity for constituents or for

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1 these constituents is determined, as individuals, so
2 one takes compounds that are -- that are not diluted
3 with other things.

4 Q. Okay.

5 A. For example, benzopyrene, one paints neat
6 benzopyrene on the back of -- of mice and determines
7 that there's excess tumors.

8 Q. But we do know that if you take each one of
9 those individual ingredients that's been identified
10 as a carcinogen and combine it all together and put
11 it in the very form that we're talking about,
12 cigarette smoke, and paint that cigarette smoke on
13 the back of an animal, it does in fact produce
14 tumors; correct?

15 MR. PLESEC: Objection.

16 A. You get increased tumorigenicity when you --
17 when you paint high levels of condensate on the backs
18 of mice.

19 Q. So in that sense, it would be inaccurate and
20 false to tell the public that no one has been able to
21 identify an ingredient or group of ingredients as
22 found in cigarette smoke which causes cancer or any
23 other disease in humans; correct?

24 MR. PLESEC: Objection.

25 A. I think the key -- again I don't have that

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1 statement in front of me to -- to look at carefully,
2 but I think a key phrase in that statement is "as
3 found in cigarette smoke," at levels and in that
4 matrix.

5 Q. Okay. But we know that if you take cigarette
6 smoke condensate, which certainly would have all
7 those individual chemicals in it in exactly the level
8 you find in cigarette smoke, and paint that on the
9 back of mice, you in fact will produce an excess
10 amount of tumors in animals; correct?

11 A. That's --

12 MR. PLESEC: Objection.

13 A. -- correct, and I think almost everybody knows
14 that. Don't you?

15 Q. Okay. So it would be inaccurate then to tell
16 people that no one has been able to identify an
17 ingredient or group of ingredients as found in
18 cigarette smoke which causes cancer or any other
19 disease in humans; correct?

20 MR. PLESEC: Objection.

21 A. Well if you're interpreting "group of
22 ingredients" to mean the entire collection of
23 ingredients, that's certainly not the way I interpret
24 that sentence at all.

25 Q. Would my --

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1 A. By "group of ingredients," I mean a subset, you
2 know, a class of compounds or a group of compounds
3 that are a subset of that entire mixture.

4 Q. So in essence, what you're saying is what that
5 sentence is saying is that no one's found the silver
6 bullet; right?

7 MR. PLESEC: Objection.

8 A. No one's found the silver bullet. There is not
9 a silver bullet that anyone's found or a combination
10 of silver bullets at the level present in cigarette
11 smoke.

12 Q. But you would agree that for a layman reading
13 that sentence, it would be reasonable to interpret it
14 as the cigarette companies telling them that no one
15 has found any ingredients in cigarette smoke that
16 cause cancer; correct?

17 MR. PLESEC: Objection.

18 A. Well personally I don't see that as a statement
19 written for a layman.

20 Q. You don't? Do you think that's a statement that
21 could mislead a layman?

22 MR. PLESEC: Objection.

23 A. I don't know whether it could mislead a layman
24 or not. I think it would be very difficult to
25 understand.

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1 Q. And potentially misleading to a layman;
2 correct?

3 MR. PLESEC: Objection.

4 A. I don't know whether it would be mislead them or
5 not. I have no idea.

6 Q. It would be unreasonable to put a statement --
7 statement like that into a public announcement issued
8 by a cigarette company such as R.J. Reynolds;
9 correct?

10 MR. PLESEC: Objection.

11 A. I don't know. All I'm saying is that that is a
12 complicated statement. As a scientist, I try to look
13 at things very carefully, and we've been back and
14 forth on what that statement means, so --

15 Q. It's pretty confusing at least for a
16 nonscientist; correct?

17 MR. PLESEC: Objection.

18 A. I don't know whether it would be confusing or
19 not. I don't like that statement personally.

20 Q. Let's go back to the research on hydrocyclic --
21 on polycyclic hydrocarbons.

22 It was your understanding that by, for instance,
23 1959 R.J. Reynolds had in fact identified at least 14
24 polycyclic hydrocarbons that were either known
25 carcinogens or thought to be carcinogenic; correct?

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1 MR. PLESEC: Objection.

2 A. I can't remember the exact numbers. I know that
3 by the end of the '50s we had certainly identified a
4 number of polycyclic aromatic hydrocarbons, some of
5 which were thought to be animal carcinogens.

6 Q. Okay. So by --

7 By the end of the '50s, R.J. Reynolds knew that
8 there was no silver bullet such as benzopyrene that
9 they could simply eliminate and solve the problem;
10 correct?

11 MR. PLESEC: Objection.

12 A. No, I don't think that's correct at all. I
13 think the rest of the scientific community and
14 Reynolds together looked at various hypotheses, and
15 in every case those hypotheses were -- were argued as
16 if they were the silver bullet.

17 Q. Well did Reynolds argue those hypotheses as if
18 they were the silver bullet knowing full well by the
19 end of the 1950s that there were at least 8 and maybe
20 as many as 14 carcinogenic polycyclic hydrocarbons in
21 cigarette smoke?

22 A. Well I think you're confusing the --

23 MR. PLESEC: Objection.

24 A. -- situation because the silver bullet in that
25 case happens to be the class of compounds of

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1 polycyclic aromatic hydrocarbons. Benzopyrene
2 happens to be the one present in the largest
3 quantity. It's the one that was identified first.
4 Nobody's ever made light of the fact that there
5 are more present at much lower levels, but it's the
6 entire class of polycyclics that's thought to be the
7 problem.

8 Q. Okay.

9 A. Benzopyrene is a marker for that class really.
10 Q. So by the 1950s R.J. Reynolds knew internally
11 that benzopyrene wasn't the silver bullet but that
12 there were several silver bullets; that is, there
13 were these numerous compounds that all belonged to
14 this one class of polycyclic hydrocarbons; correct?

15 MR. PLESEC: Objection.

16 A. No, you're misinterpreting the notion of silver
17 bullet again. It's -- this is -- the silver bullet
18 theory, as I've discussed it in testimony -- I'm
19 sorry it's misleading you and others, but I'll tell
20 you --

21 Q. Well I'm only worried about the jury.

22 A. Okay. But I'll tell you that the -- that the
23 silver bullet theory was one that scientists in fact
24 engaged in outside of Reynolds. They do it today
25 even in non-tobacco issues. A scientist will develop

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1 a hypothesis and then will set about testing that
2 hypothesis, and in the case of cigarette smoke the
3 silver bullet theory was that there was one compound
4 or one class of compounds that accounted for the
5 mouse skin tumorigenicity, or in some -- to use other
6 scientists' terms, or was the problem.

7 Q. And you --

8 A. And as science developed, even toxicology got to
9 the point where it walked away from silver-bullet
10 approaches in complex mixtures.

11 Q. Okay. Well you at --

12 You at R.J. Reynolds, your research and
13 development department, you weren't misled by this
14 so-called silver bullet theory that there was only
15 one ingredient or one group of ingredients that
16 caused cancer, were you?

17 MR. PLESEC: Objection.

18 A. I don't know what you mean by "misled." I don't
19 think scientists at R.J. Reynolds were misled at
20 all. I think scientists at R.J. Reynolds were
21 responding to the theories that were being placed on
22 the table by a variety of scientists.

23 Q. But of course R.J. Reynolds was part of a
24 company that was actually producing the product, so
25 they had an even higher duty to find out what it was

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1 in cigarette smoke that caused cancer; correct?

2 MR. PLESEC: Objection.

3 A. We've worked hard on the problem of cigarette
4 smoking being a risk.

5 Q. And let me just go back to my question. By the
6 1950s R.J. Reynolds knew internally based on its own
7 research that benzopyrene wasn't the silver bullet
8 and that there were in fact several compounds that
9 R.J. Reynolds had itself identified in smoke that
10 were carcinogenic; correct?

11 MR. PLESEC: Objection.

12 A. You're -- you're again misunderstanding the
13 notion of silver bullet. The silver bullet was meant
14 to include the entire class of polycyclics, which
15 you're wanting to break down and say they're
16 different bullets, the entire class of polycyclic
17 aromatic hydrocarbons. That was the first theory
18 that was placed on the table. Benzopyrene was the
19 one that was focused on most because it's present in
20 cigarette smoke in the highest concentration, even
21 though that's still in the nanogram level.

22 Q. Okay.

23 A. Now the next silver bullet theory was in fact
24 the cocarcinogen or promoter theory, which brought us
25 into the phenols. After that there was another

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1 silver bullet theory, which happened to be
2 ciliastasis.

3 Q. If I wanted to do some research on this
4 so-called silver bullet theory, where would I go in
5 the public literature to find it espoused by one of
6 the scientists that you're talking about? Which
7 scientist espoused this silver bullet theory or which
8 group of scientists espoused this silver bullet
9 theory that you want to talk about?

10 A. I'll direct you to -- I'll direct you to one
11 good source that would be a start, and it's the
12 Banbury Conference report.

13 Q. From what year?

14 A. It was published in 1981. There's a lot of
15 discussion about the moving target of the -- and I
16 don't think Dr. Gori called it the silver bullet
17 theory, but it's essentially the same thing.

18 Q. Now the Banbury Conference report, did that have
19 participants from the tobacco industry in it?

20 A. There were two participants that I can recall
21 from supplier industries. I can't recall tobacco
22 company --

23 Q. Okay.

24 A. -- representatives.

25 Q. Let's go back again to the silver bullet because

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1 again no one ever eliminated benzopyrene as one of
2 the bullets. They simply added to that bullet;
3 correct?

4 MR. PLESEC: Objection.

5 A. What do you mean "simply added to that bullet"?

6 Q. Well, I've used the analogy of a target, and if
7 we take first benzopyrene as the target, R.J.

8 Reynolds knew that benzopyrene wasn't the only target
9 so it expanded out and now we had a larger target;
10 that is, we had an entire group of carcinogenic
11 agents, the polycyclic hydrocarbons, that R.J.

12 Reynolds knew was in the smoke. And what we're going
13 to add to that next is the phenols, which are thought
14 to again potentiate the known carcinogens in smoke.

15 So no one's eliminated benzopyrene as a
16 problem. No one has said that -- that, "We've now
17 got -- you know, we've now moved from benzopyrene as
18 the problem to phenols as the problem." They're now
19 expanding on their knowledge and saying, "Benzopyrene
20 alone might not be it. Maybe it's benzopyrene and
21 this group of substances interacting together that
22 are causing the problem"; correct?

23 MR. PLESEC: Objection.

24 A. No, I don't think that's accurate. I think
25 there's been new theories placed on the table. There

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1 have been multiple targets. The old targets haven't
2 gone away as areas of concern, but I'll tell you that
3 some -- some of the theories, like nitrosamines, for
4 example, are intended to -- I mean, the theory is,
5 the way it's been framed is that it is the problem.

6 Q. By who? Who framed it as the problem?

7 A. Probably Hoffmann. I mean, he's -- he's come --
8 he seems to have come to that conclusion, that --
9 that tobacco-specific nitrosamines is the problem.

10 Q. And he's just one scientist; right?

11 A. Yeah, but he's a very important scientist. He's
12 developed -- well he's been involved in tobacco and
13 tobacco smoke research for 50 years.

14 Q. There's other people out there that disagree
15 that nitrosamines are the only problem; correct?

16 A. Sure there are. Of course.

17 Q. Right. I mean, the scientific community by and
18 large still thinks that there's numerous substances
19 in cigarette smoke that cause cancer; correct?

20 MR. PLESEC: Objection.

21 A. And I'll tell you what I think personally.

22 Q. Answer my question.

23 A. Okay. Can you repeat it? I'm sorry, I was --

24 Q. The scientific community by and large still
25 thinks that there's numerous substances in cigarette

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1 smoke that cause cancer; correct?

2 A. My answer to that is I believe that the
3 scientific community by and large believes that there
4 are a number of constituents in cigarette smoke that
5 have shown carcinogenicity under some laboratory
6 tests.

7 Q. Well the fact of the matter is, is that there's
8 a number of scientists, in fact the majority of the
9 scientific community, that think the substances --
10 strike that.

11 The fact of the matter is that there's a
12 majority of the scientific community that thinks that
13 there are numerous substances in cigarette smoke that
14 cause cancer and other diseases; correct?

15 MR. PLESEC: Objection.

16 A. That cause human cancer?

17 Q. Absolutely.

18 A. I think there are many scientists who believe
19 that. At --

20 Q. The vast majority.

21 A. -- at the -- at the levels present in cigarette
22 smoke, I don't know.

23 Q. The vast majority of scientists believe that the
24 substances contained in cigarette smoke as contained
25 in cigarette smoke cause cancer in humans; correct?

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1 MR. PLESEC: Objection.

2 A. I believe that the majority of scientists have
3 concluded that cigarette smoking causes cancer.

4 Q. In fact, the only people that really don't
5 accept that cigarette smoking causes cancer are
6 scientists working for or paid by the industry;
7 correct?

8 MR. PLESEC: Objection.

9 A. I don't know whether that's true or not. I
10 haven't gone out and done a poll of scientists.

11 Q. I believe you testified that R.J. Reynolds
12 undertook a number of different steps to try to
13 eliminate benzopyrene from cigarette smoke. Is that
14 correct?

15 A. A number of steps.

16 Q. Now when you're talking about benzopyrene, are
17 you talking about benzopyrene and all the polycyclic
18 hydrocarbons or are you simply talking about
19 benzopyrene?

20 A. What happens to benzopyrene also happens to the
21 other polycyclics.

22 Q. Okay.

23 A. We -- we view benzopyrene as a marker for the
24 entire class, polycyclic aromatic hydrocarbons,
25 because they're all formed in the same way, we

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1 believe. We have a good quantitative reproducible
2 measure for benzopyrene, which happens to be present
3 in the largest concentration of any of these.

4 Q. And despite all your efforts to remove
5 benzopyrene and the other polycyclic hydrocarbons
6 from cigarette smoke, you were never able to do so;
7 correct?

8 A. That's not true at all. We were technically
9 able to reduce benzopyrene and we believe the other
10 polycyclic aromatic hydrocarbons to a significant
11 degree.

12 Q. Okay. Did you ever commercialize a cigarette
13 that in fact so reduced the benzopyrene and other
14 polycyclic hydrocarbons from cigarette smoke?

15 A. In -- with selective reduction, we had major
16 problems that prevented the implementation of that in
17 the marketplace -- place. With general reduction,
18 we've had major success, and that's implemented in
19 the marketplace.

20 Q. I'm talking about specific reduction, sir. You
21 spend some page after page after page of trial
22 testimony in other trials talking about everything
23 you did to selectively remove benzopyrene and the
24 other polycyclic hydrocarbons, and my question is:
25 Were you ever successful in selectively removing the

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1 polycyclic hydrocarbons from a commercial cigarette?

2 MR. PLESEC: Objection.

3 A. That's not exactly the way you phrased the
4 question in the first place.

5 Q. Well I am phrasing it that way now, and so --

6 A. I know, and I don't appreciate your --

7 Q. -- let me ask it again.

8 A. -- I don't appreciate your -- the way you're
9 going about this.

10 Q. Let me ask it again.

11 A. I'm trying to answer your question as you ask
12 it. You asked me if we've ever reduced it, and I
13 tell you yes, we've reduced it in selective reduction
14 techniques technically, but we haven't been able to
15 implement that in a practical sense but we have done
16 it through general reduction. I'm specifically
17 addressing your question as it was asked or at least
18 as I heard it being asked.

19 Q. And now I'm going to ask you another question.

20 A. And now you're going to change it, but I don't
21 appreciate the lecture that you give.

22 Q. What lecture did I give? Sir, I didn't give you
23 any lecture. Listen, I don't appreciate having --

24 MR. PLESEC: Counsel, let's just move on.

25 MR. O'FALLON: No, no.

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1 MR. PLESEC: Answer -- or --

2 Q. I don't appreciate --

3 MR. PLESEC: -- ask the next question.

4 Q. I don't appreciate being told that I'm lecturing
5 you. This is the question I asked you, and I'm going
6 to repeat it again. And if it's lecturing, I'd
7 appreciate that you tell me where it's lecturing.

8 Okay? This is the question I asked. I'm going to
9 read it off the screen. Quote, "I'm talking about
10 specific reductions, sir. You spend some page after
11 page after page of trial testimony in other trials
12 talking about everything you did to selectively
13 remove benzopyrene and the other polycyclic
14 hydrocarbons, and my question is: Were you ever
15 successful in selectively removing the polycyclic" --
16 "polycyclic hydrocarbons from a commercial
17 cigarette?"

18 A. That's not the first question you asked me on
19 this subject.

20 Q. Would you please answer the following question:
21 Were you ever successful in selectively removing the
22 polycyclic hydrocarbons from a commercial cigarette?

23 A. You're telling me that was the first question
24 you asked?

25 Q. I'm asking you the question. Here's the

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1 question. I'm going to start again. Here's the
2 question: Were you ever successful in selectively
3 removing the polycyclic hydrocarbons from a
4 commercial cigarette?

5 A. We've been -- we've been -- we've been
6 successful reducing the levels of polycyclic aromatic
7 hydrocarbons in commercial cigarettes. We've not
8 been successful effecting a selective reduction of
9 benzopyrene or the other PAHs because of practical
10 problems, but we have been successful in general
11 reduction reducing the overall levels.

12 Q. I'm going to move to strike that as
13 nonresponsive. Again I'm asking specifically about
14 the selective removal. And this is my question:
15 Were you ever successful in selectively removing the
16 polycyclic hydrocarbons from a commercial cigarette?

17 A. Technically we've removed or reduced the levels
18 of -- of benz -- benzo[a]pyrene and presumably the
19 other PAHs because we use BaP as a marker. We've had
20 technical success in reducing the levels. We've had
21 practical problems which has prevented the
22 implementation in the marketplace.

23 Q. Okay. So the question --
24 The answer is no, you've never been able to
25 selectively remove the polycyclic hydrocarbons in a

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1 commercial cigarette; correct?

2 A. I just answered your question.

3 MR. PLESEC: Objection.

4 Q. Sir, you've never been able to selectively
5 remove the polycyclic hydrocarbons in a commercial
6 cigarette; yes or no?

7 MR. PLESEC: Objection.

8 A. To selectively remove?

9 Q. Yes.

10 A. We've not been able to develop selective removal
11 techniques that -- that we could commercialize for
12 benzo -- benzo[a]pyrene or other PAHs because of
13 technical -- or practical problems.

14 Q. And what were those practical problems?

15 A. One technique that we found that did technically
16 reduce BaP in cigarette smoke was solvent
17 extraction. The solvent extraction had significant
18 problems in that there was residual solvent in the
19 tobacco, and our job is to reduce compounds, not add
20 new ones.

21 And the second issue was that the tobacco
22 characteristics, the physical characteristics, were
23 too fragile to make good cigarette rods. And a third
24 concern was when we extracted tobacco with solvent to
25 re -- and did reduce BaP, phenol levels went up, and

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1 phenol was -- and the phenol or cocarcinogen was
2 another theory on the table at the time.

3 Q. So in other words, you couldn't reduce one
4 carcinogenic compound without increasing another
5 carcinogenic compound; correct?

6 MR. PLESEC: Objection.

7 A. What I said was the solvent extraction increased
8 phenols, which was another theory on the table at the
9 time.

10 Q. They were thought to be carcinogens; correct?

11 A. They were thought to be cocarcinogens or
12 promoters.

13 Q. And did you ever do any research at R.J.
14 Reynolds to determine out whether in fact phenols
15 were cocarcinogens?

16 A. I think there's been considerable debate about
17 that. There's been some research done at Reynolds.
18 There's been some research done outside. We've had
19 ongoing discussions with scientists on this.

20 Q. Did you conclude that in fact phenols were
21 cocarcinogens?

22 MR. PLESEC: Objection.

23 A. I think -- I think in general the scientific
24 community walked away from it and today most of the
25 scientific community even looks at many phenols as --

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1 as beneficial because they're free-radical scavengers
2 as well as have other beneficial effects, so I think
3 science has really migrated away from phenols being
4 cocarcinogens.

5 Q. Based on the research you did at R.J. Reynolds,
6 did you conclude, "you" meaning R.J. Reynolds, that
7 phenols were cocarcinogens or not?

8 A. I don't think we concluded that one way or the
9 other.

10 Q. Okay. Now I believe that it was your testimony
11 that it was your job to reduce compounds in cigarette
12 smoke, not add new ones.

13 MR. PLESEC: Objection.

14 A. The overall -- the overall goal in product
15 development, one of our major goals has been to
16 reduce smoke constituents, to reduce the chemistry
17 and reduce biology. In the course of doing that, we
18 don't increase or add -- we don't want to increase or
19 add new compounds to the smoke as a result of those
20 design changes.

21 Q. Well but over time you've added numerous,
22 numerous substances to cigarette smoke, haven't you?

23 MR. PLESEC: Objection.

24 A. What kind of substances are you referring to?

25 Q. Well there's probably a laundry list, but I

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1 could start with ammonia.

2 A. We've used ammonia in processing.

3 Q. You've added ammonia to cigarettes since

4 approximately 1975; correct?

5 A. But ammonia is not a compound that's looked at

6 as being a problem compound. It's not one of the

7 theories that's on the table about why cigarette

8 smoking is a risk for a number of diseases.

9 What I'm talking about is increasing the levels

10 or adding compounds that might generate compounds

11 that are problematic.

12 Q. Okay. So was there something in the solvents

13 you were using to extract the benzopyrene that was

14 believed to cause cancer?

15 A. We used a variety of solvents, including ether,

16 pentane, hexane, heptane, a variety of other

17 solvents.

18 Q. Were those believed to be cancer-causing

19 substances?

20 A. In themselves, I don't think so.

21 Q. Well so how are they different than ammonia?

22 MR. PLESEC: Objection.

23 A. We use --

24 Q. It's my understanding that you didn't want these

25 solvents remaining in your tobacco, these solvents

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1 you'd used to remove the benzopyrene, so we know, for
2 instance, you add ammonia, so I guess I'm asking is
3 there something about these substances that's
4 different than ammonia that you didn't want them left
5 in the tobacco where you actually intentionally add
6 ammonia to the tobacco?

7 MR. PLESEC: Objection.

8 A. I think there was some concern about having
9 residual solvents in the extracted tobacco. The
10 details of that I don't recall.

11 Q. Do you know whether there was testing done to
12 determine whether those remaining solvents were
13 somehow carcinogenic or harmful to health?

14 A. I don't recall such tests. I do recall that we
15 really couldn't get good cigarette rods made because
16 the tobacco was too fragile, and it may well have
17 been the overriding factor.

18 Q. Okay.

19 A. I just don't recall. I would have to go back
20 and look.

21 Q. So it may well be that the reason you didn't
22 commercialize a product that selectively removed the
23 hydro -- polycyclic hydrocarbons is simply because
24 you couldn't make a product that you found acceptable
25 from a commercial point of view, not because there

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1 was some substance left over that was harmful;
2 correct?

3 MR. PLESEC: Objection.

4 A. And I already told you that there was an
5 increase in the phenol levels, --

6 Q. Okay.

7 A. -- which was a concern.

8 Q. Well but you then told me that phenols aren't a
9 concern.

10 A. But at that time we didn't know that. Everybody
11 else was chasing phenols too.

12 Q. Well, but you had scientists. What were your
13 scientists concluding at that time?

14 MR. PLESEC: Objection.

15 A. It's very clear from documents that I've looked
16 at that there was a maj -- major concern that phenol
17 levels were increased when we solvent extracted
18 tobacco by our scientists as well as -- you know,
19 which -- which dovetailed into the -- to the -- the
20 whole approach of the theory of cocarcinogenesis that
21 was on the table.

22 Q. And again --

23 MR. PLESEC: Dan, can we take a five-minute
24 break? Then we'll go for maybe another half hour.

25 MR. O'FALLON: That would be fine.

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1 MR. PLESEC: Okay.

2 THE REPORTER: Off the record, please.

3 (Recess taken.)

4 BY MR. O'FALLON:

5 Q. Doctor, during the previous questioning I
6 believe I asked you whether or not there were any
7 scientists other than scientists employed by or
8 contracted by the tobacco industry who believed that
9 smoking did not cause disease, and you said that you
10 didn't know. Can you name --

11 MR. PLESEC: Objection. I'm not sure that
12 that is a proper characterization of his testimony.

13 MR. O'FALLON: Okay. Well we'll let -- I
14 was just using it as a -- as a lead-in to my next
15 question, so if it's inaccurate, then whatever your
16 previous answer was, it stands.

17 Q. Can you name one scientist who was not in the
18 employ of the tobacco industry or who was not under
19 contract with the tobacco industry who does not
20 believe that smoking causes disease?

21 A. This is an area that I'm not an expert in. I've
22 certainly not gone out and tried to find such a
23 person, so I don't know.

24 Q. So at least there's no scientist that you know
25 of outside the industry who does not believe that

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1 smoking causes disease; correct?

2 A. This is not my area. I really don't know.

3 Q. We've had a -- the opportunity to touch briefly
4 on phenols. Well actually let's go back.

5 You're a friend of Dr. Rodgman's; correct?

6 A. Well I reported to Dr. Rodgman for a long time.

7 We are personal friends --

8 Q. Okay.

9 A. -- as a result of that.

10 Q. You testified in the Raulerson case about
11 benzopyrene on a broiled steak; correct?

12 A. That's correct.

13 Q. Is that a theory you and Dr. Rodgman talked
14 about?

15 A. No, I don't remember talking about that with
16 Dr. Rodgman. I really don't remember such a thing.

17 I do remember I looked up in one chemistry text and
18 found a value for benzopyrene on a broiled steak, so
19 I incorporated -- incorporated that in my testimony.

20 Q. So the sole source of your knowledge about
21 benzopyrene on a broiled steak was looking it up in
22 one scientific text?

23 MR. PLESEC: Objection.

24 A. I've seen references to it in other articles and
25 papers.

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1 Q. Do you understand the significance of something
2 called the route of administration?

3 A. I think I understand superficially what the
4 point is.

5 Q. Okay. You understand that the route of
6 administration of any substance has a significant
7 effect on how that substance interacts in the body;
8 correct?

9 A. As in --

10 MR. PLESEC: Objection.

11 A. As in the difference between inhalation and skin
12 painting, I understand that.

13 Q. Well let's take water, for instance. You
14 understand that if you drink water, it's good for
15 you; right?

16 A. Up to a point.

17 Q. You understand if you inhale water, it's very
18 bad for you; right?

19 A. Can be.

20 Q. Right. And the same would be true of a
21 substance like benzopyrene; correct?

22 MR. PLESEC: Objection.

23 A. Maybe. I don't know.

24 Q. When benzopyrene from a steak enters your body,
25 it does so through the oral cavity and down into the

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1 stomach; correct?

2 A. I doubt that many people inhale steaks if that's
3 what you mean.

4 Q. Right. And you understand that once it's in the
5 stomach, it's going to be subject to a great many of
6 chemical bombardments; correct?

7 MR. PLESEC: Objection.

8 A. I assume so. I don't know. I'm sure it --

9 Q. Right. You also understand that should it get
10 into the bloodstream at all, it's -- even if it were
11 to eventually get to someplace like the lung, it's
12 going to have to go through numerous filtering
13 organs; correct?

14 MR. PLESEC: Objection.

15 A. I would assume so.

16 Q. I mean, it's going to have to go through the
17 liver; correct?

18 MR. PLESEC: Objection.

19 A. Sounds reasonable.

20 Q. Okay. May be subject to other chemical
21 processes in the blood itself; correct?

22 MR. PLESEC: Objection.

23 A. I suppose so.

24 Q. Okay. The lung would actually be one of the
25 filtering organs that benzopyrene may or may not

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1 reach; correct?

2 MR. PLESEC: Objection.

3 A. I don't understand that question.

4 Q. Do you understand that the lung is also a blood
5 filtering organ?

6 A. I know that there's large volumes of blood in
7 the lung or near the lung.

8 Q. Okay. Do you understand whether the lung has
9 any capacity to trap substances such as benzopyrene
10 if they somehow come in contact with lung tissue
11 through the blood?

12 MR. PLESEC: Objection.

13 A. Come in contact with lung tissue through the
14 blood? I'm sorry, can you repeat that question
15 again?

16 Q. Sure.

17 A. You're really outside my area.

18 Q. Well again this was something you testified at
19 in trial, wasn't it?

20 A. I testified simply that there are other
21 exposures in common everyday --

22 (Discussion off the stenographic record
23 to adjust the witness's microphone.)

24 A. I testified in -- in that trial that there --
25 that there are common exposures to benzopyrene, some

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1 of which are even larger in amount of exposure than
2 that of cigarette smoke.

3 Q. And you did it --

4 A. That's all.

5 Q. And you did it --

6 A. I wasn't trying to testify about any biological
7 importance or relevance other than there are other
8 exposures and some of them can be high.

9 Q. But certainly the purpose that you wanted to
10 point out to the jury in that case that benzopyrene
11 comes from many sources is to suggest that -- that
12 benzopyrene in cigarette smoke is really no more
13 harmful than benzopyrene in cigarettes -- in -- in
14 steak; correct? I mean, that's really what you were
15 trying to do?

16 MR. PLESEC: Objection.

17 A. Absolutely not. I was not trying to import any
18 biological relevance on to that at all. I was just
19 trying to make a point that benzopyrene is not unique
20 to cigarette smoke; there is common exposure to
21 benzopyrene and other polycyclics, even much higher
22 than -- than from cigarettes. I was not at all
23 trying to make any connection to biological relevance
24 of any of that.

25 Q. Well let's look at your testimony. Why don't

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1 you look at page 3,135 of the testimony that's
2 attached to your expert report.

3 A. Okay. 3,135?

4 Q. 3,135.

5 A. Okay.

6 Q. Let's look down on line 11 on 3,135. Are you
7 with me?

8 A. Yes.

9 Q. The question is asked -- now this is -- this
10 question is being asked by an attorney for R.J.
11 Reynolds; correct?

12 A. This is in my direct examination.

13 Q. Okay. The question is: "Dr. Townsend, can you
14 compare the ... do you -- based on your familiarity
15 with the literature in this area, how does the level
16 of BaP that's in smoke compare with the level" of
17 "BaP that's in, for example, charcoal broiled
18 steak?" That's the question; right?

19 A. You read that accurately.

20 Q. And BaP is benzopyrene; correct?

21 A. That's correct.

22 Q. Now he talks about literature. He doesn't say,
23 "How did the one book you read compare it?" Right?

24 A. Well he wasn't terribly specific. I can tell
25 you that that's where I got this calculation I used.

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1 Q. Okay. So this is all just from one textbook?

2 MR. PLESEC: Objection.

3 Q. Just so I'm clear.

4 A. I've just testified a few minutes ago to one of
5 your questions that I found this in an organic
6 chemistry textbook. I found a measurement of
7 benzopyrene in that textbook. I've also seen
8 references in other articles about the presence of
9 benzopyrene in charcoaled steaks and other food
10 stuffs.

11 Q. Okay. But when you --

12 You're going to show the jury a chart down
13 there; right? Did you draw the information that you
14 put in the chart from the one organic chemistry
15 textbook?

16 MR. PLESEC: Well objection. Let -- let
17 the witness review the testimony rather than just
18 this one line to see what -- what is going on here.
19 Why don't you read a couple of pages before an answer
20 to put this in context.

21 Q. Well I tell you what, let's read it together so
22 that the jury and everybody knows the exact context
23 of your testimony.

24 After he answers that question at line 16, he
25 says, answer -- you answer, "Well, in charcoal

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1 broiled steak, if you look at an 8-ounce charcoal
2 broiled steak, there's roughly -- the benzpyrene
3 equivalent to 600 cigarettes, or in the smoke of 600
4 cigarettes, so it's a big difference."

5 And then they say, "What about a comparison
6 between -- well, strike that.

7 "Dr. Townsend, have you prepared a chart which
8 summarizes the level of BaP that's found in common
9 foods?"

10 And then there's a lot of colloquy between
11 lawyers, and eventually a chart that's been marked as
12 Exhibit 46 is put up; correct?

13 A. There is "exhibit." I don't see -- is it
14 Number 46?

15 Q. Well 3,137 says --

16 A. Oh, I see it, yes.

17 Q. -- "Number 46," sir. Do you see that?

18 A. Yes.

19 Q. Okay. Do you recall that testimony?

20 A. Yes, I do.

21 Q. Do you recall that chart?

22 A. Yes, I do.

23 Q. What was the source of that chart?

24 A. It was several articles in the scientific
25 literature.

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1 Q. Okay. Do you recall the names of those
2 articles?

3 A. Can't recall the titles of the articles
4 exactly. I can certainly pull them out of my file.

5 Q. Okay. And then you're asked down at line 12,
6 "Would you please explain what this chart depicts,
7 Dr. Townsend?" Do you see that?

8 A. Right.

9 Q. And you say, "This chart tries to show relative
10 amounts of benzpyrene that are present in various
11 food stuffs and demonstrates really that there's a
12 wide range of benzpyrene, and" that "this is at
13 levels of" nan -- "nanogram per gram of material.
14 There's a wide range of benzpyrene present even in
15 fresh vegetables, vegetable oils, down to coffee,
16 tea, grains, and certainly cooked materials, cooked
17 breads, cooked meats, generate" high "levels of
18 benzpyrene"; correct?

19 A. You read that accurately.

20 Q. And isn't really what you're trying to suggest
21 there to the jury is that benzopyrene is really
22 commonly occurring, often in levels that are much
23 higher than cigarette smoke?

24 MR. PLESEC: Objection. You can answer.

25 A. I believe that what I was trying to convey was

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1 that benzopyrene is present in many foods, often at
2 levels that are much higher.

3 Q. And really --

4 A. And I was not trying to make any biological
5 implication or reference to it.

6 Q. Okay. So you were not trying to suggest to the
7 jury that all these things that you've listed, fresh
8 straight -- or broiled steak, fresh vegetables,
9 vegetable oils, that those are basically healthy and
10 don't cause lung cancer. That wasn't something you
11 were trying to imply?

12 A. Absolutely not.

13 MR. PLESEC: Objection.

14 Q. Because that would have been inappropriate, to
15 imply that; right?

16 MR. PLESEC: Objection.

17 A. I'm not an expert in this area. I wouldn't
18 begin to suggest that.

19 Q. And the fact of the matter is, is that you're
20 really comparing apples and oranges here or, more
21 appropriately, apples and smoke here; right?

22 MR. PLESEC: Objection.

23 A. I don't -- what -- what do you mean?

24 Q. Well the fact of the matter is that all of the
25 food stuffs have a much different route of

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1 administration than cigarette smoke; correct?

2 A. But you're -- you're getting back into the
3 biological relevance of this, and I've just told you
4 that I tried -- that I was not making any point about
5 the biological relevance. All I was trying to do was
6 show that benzopyrene is present in a lot of things;
7 it's not unique to cigarette smoke.

8 Q. I know, but what -- I guess what I'm talking
9 about here is what you failed to tell the jury, and
10 what you failed to tell the jury is that none of the
11 food stuffs that you've identified have a route of
12 administration that's similar to cigarette smoke;
13 correct?

14 MR. PLESEC: Objection.

15 A. Earlier in the testimony I spoke to air
16 pollution. That has -- excuse me. That has a
17 similar route of administration.

18 Q. I'm talking about this specific testimony right
19 here, sir.

20 A. Well I'm talking about the entire passage
21 because you started right here right below "Yes,"
22 "and air pollution" in line 8 and 9 of page 3,135.
23 You started at the very next line.

24 Q. I'm talking about your whole analogy using steak
25 and food stuffs as containing benzopyrene.

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1 A. And all you asked me was that I did not mention
2 things that had the same route -- route of
3 administration or mode of administration, and I'm
4 telling you it's spoken to right here on this page.

5 Q. You --

6 A. I wasn't trying to mislead anybody. I don't
7 believe I did. I think I was trying to convey to
8 them only the message that it's present in a number
9 of common materials, food, commonplace exposure, and
10 oftentimes at much higher levels. That's all, no
11 biological relevance, period.

12 Q. Well if it has no biological relevance, then why
13 did the jury need to hear it?

14 MR. PLESEC: Objection.

15 A. What, that it's present in other things?

16 Q. In these high levels. If -- if these food
17 stuffs have no relevance to cigarette smoke, why did
18 you feel compelled to tell the jury about it?

19 A. I didn't say it had no relevance. I said I
20 wasn't trying to draw any biological relevance
21 myself. I didn't make any -- in answering your
22 questions, I'm not making any judgment about
23 relevance, period, --

24 Q. Okay. Well what -- what relevance --

25 A. -- one way or the other.

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1 Q. What relevance do you believe the amount of
2 benzopyrene in food stuffs such as steak has to
3 whether or not cigarette smoking causes cancer?

4 MR. PLESEC: Objection.

5 A. I am not talking about biological relevance of
6 these levels. We are talking about analytically
7 measured levels in various things, including smoke
8 and foods, and all I'm trying to do is make the point
9 that there's widespread exposure to benzopyrene.

10 Benzopyrene is formed in combustion sources, so it's
11 a very common material. It's found on food as a
12 result of deposition in the fields and of probably a
13 variety of other mechanisms, so it is present.

14 That's all, no biological implications, only that
15 it's a common material.

16 One of the things that nonscientists certainly
17 do is they react to the use of a term -- a highly
18 technical chemical term and they don't understand it
19 and all of a sudden it becomes mysterious. This is
20 to convey that this is not unique to cigarette
21 smoke. That's all.

22 Q. But again, what you don't tell the jury is that
23 food stuffs have a much different route of exposure
24 for their benzopyrene than does cigarette smoke;
25 correct?

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1 MR. PLESEC: Objection.

2 A. I was not trying to make any biological
3 relevance, including route of administration.

4 Q. Okay. My question is: You don't tell the jury
5 that the food stuffs have a much different route of
6 exposure; right?

7 MR. PLESEC: Objection.

8 A. That was not part of the testimony because I was
9 not trying to imply anything about -- about
10 biological implications.

11 Q. Have any of those food stuffs that you outlined
12 here been linked to lung cancer?

13 MR. PLESEC: Objection.

14 A. I really don't know. Positively or negatively I
15 really don't know.

16 Q. And again the benzopyrene from these various
17 food stuffs will in all likelihood not even reach the
18 lung; correct?

19 MR. PLESEC: Objection.

20 A. I really don't know. This is not my area. I
21 think -- I think you're being quite selective,
22 however, in the testimony because you do ignore the
23 reference to air pollution.

24 Q. Well, sir, I'm --

25 A. And there is benzopyrene in air pollution,

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1 particularly in industrial cities.

2 Q. I'm a little confused by the fact that you say
3 this is not your area of expertise since of course
4 this is appended to and incorporated in your expert
5 report, is it not?

6 A. What, this entire testimony?

7 Q. Yes.

8 A. Well I think the entire Kueper testimony was --
9 was appended, wasn't it?

10 Q. Is it incorporated in your expert opinion?

11 A. Is what incorporated in my expert opinion?

12 Q. The entire testimony that we've -- the entire
13 testimony that's attached.

14 A. I have an expert statement that summarizes
15 testimony, expected testimony in this case. I have
16 attachments that provide reference and is a fuller
17 description of the things that are summarized in this
18 expert report.

19 Q. Okay. So as part of your expert testimony in
20 this case, you're reserving the right to get up and
21 tell the jury about the level of benzopyrene in food
22 stuffs; correct?

23 A. Yes, I am in terms of the very specific and
24 clear reason for doing so, which is to show that
25 benzopyrene is not unique to cigarette smoke; it is

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1 present in many, many common substances, even at
2 higher levels in -- in some.

3 Q. But --

4 A. And no biological implication.

5 Q. But by your own admission, these food stuffs
6 that you're talking about have benzopyrene that will
7 never get to the organ we're talking about, which is
8 the lung; correct?

9 MR. PLESEC: Objection.

10 A. I believe you said that. I said I don't know.

11 Q. Okay. So you can't tell whether or not any of
12 this benzopyrene in these food stuffs that you want
13 to talk about is going to go to the lung; correct?

14 A. But you're going back to biological relevance.

15 I have told you that that's where the line is drawn.
16 I am talking about analytical levels in various
17 exposures.

18 Q. Well with all due re --

19 A. I'm not talking about anything about biological
20 relevance, in spite of the fact that that's where you
21 keep going.

22 Q. Well would you point to me the place in this
23 testimony where you tell the jury down in that
24 smoking-and-health case that what you were talking
25 about had no biological relevance. Would you please

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1 point to me in that transcript where you say that to
2 the jury.

3 MR. PLESEC: Objection.

4 A. I did not get into the biological relevance of
5 this. I told you what it was intended for. I made
6 that statement, and that was it.

7 Q. Show me the place in that transcript in the
8 Raulerson case where you told the jury that your
9 testimony about the level of benzopyrene in various
10 food stuffs, including steak, had no biological
11 relevance. Show me that testimony.

12 A. There is no such statement in there because I
13 never intended to give that kind of implication, and
14 I don't think I did.

15 Q. Did you talk to the jury afterwards and ask if
16 they had that implication?

17 MR. PLESEC: Objection.

18 A. Of course not.

19 Q. So you can't really testify that in fact that
20 implication wasn't picked up by the jury, can you,
21 sir?

22 A. Look, I'm --

23 MR. PLESEC: Objection.

24 A. -- telling you what I did in my mind. I'm
25 telling you what I intended as well as what I did.

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1 There you have it.

2 Q. And just so we're clear, anything that you said
3 that -- in the attached pages to the Raulerson report
4 is incorporated in your expert opinion here in the
5 State of Minnesota; is that correct?

6 A. I'm sorry, back up and please say that again.

7 Q. Just so we're clear, anything that you said in
8 the attached pages from the Raulerson trial is
9 incorporated in your expert opinion and expert report
10 here in the State of Minnesota; is that correct?

11 A. Well I'm not a lawyer. I don't understand the
12 distinction. The expert report gives a general
13 outline of expected testimony. This is an example of
14 more detailed testimony that speaks to the -- to the
15 general outline in the expert report. I'm not a
16 lawyer.

17 Q. Well did your lawyers write your expert report?

18 A. No, they didn't.

19 Q. You wrote your expert report; correct?

20 A. The lawyers and I together wrote the expert
21 report --

22 Q. Well which part --

23 A. -- based on testimony.

24 Q. Which part of the report did the lawyers write
25 and which part did you write?

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1 MR. PLESEC: Objection.

2 A. Good grief. What we did was we sat down with
3 current testimony and wrote a summary. We both
4 edited it. We both went back and forth to make sure
5 it was complete, that it was accurate, that -- that
6 nothing was left out, and then I signed it.

7 Q. Okay. And let's look on the last page of your
8 report, page eight, where you did in fact sign it.
9 You state on page eight that "My report" -- and
10 presumably when you're saying "my," you're talking
11 about yourself, not you and your lawyers; right?

12 A. I'm talking about myself. I signed it; my
13 lawyers didn't.

14 Q. You said "My report also includes the matters
15 and opinions I discussed during my trial testimony on
16 direct examination in the matter styled Estate of
17 Connor v. R. J. Reynolds Tobacco Company et al., Case
18 Number 95-01820-CA," parenthetical, "(Duval County,
19 Florida). A copy of that testimony is attached as
20 Exhibit A"; correct?

21 A. You read that correctly.

22 Q. Is there any part of the testimony that's
23 attached that you do not consider part of your expert
24 opinion?

25 MR. PLESEC: Objection.

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1 A. Well in -- in the direct testimony, which is I
2 believe what -- what was appended here, I think that
3 speaks to my -- my expert opinion.

4 Q. Okay. And again, as an expert, you would agree
5 that the benzopyrene in food stuff has not been
6 associated with an increase in lung cancer; is that
7 correct?

8 MR. PLESEC: Objection, asked and
9 answered.

10 A. I beg your pardon?

11 Q. The benzopyrene in the food stuffs you
12 identified in your direct examination in Connor has
13 not been linked with an increased risk of lung
14 cancer; correct?

15 MR. PLESEC: Objection.

16 A. You did ask me this earlier, and I think my
17 answer was I don't know.

18 Q. Okay.

19 A. And I don't know whether it's a -- whether even
20 if there's a link, there's a positive link or a
21 negative link. It could be either.

22 Q. And again just so we're --

23 A. I don't know.

24 Q. And again just so the record's clear, you can't
25 testify whether any of the benzopyrene that's in

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1 those food stuffs ever reaches the lung; correct?

2 A. I don't know.

3 Q. What is the level of benzopyrene in the air?

4 A. In the air it's -- well it depends on where you
5 are.

6 Q. Well how about Minnesota since that's where this
7 case is?

8 A. Well it looks pretty clean today. I would say
9 it's quite low here.

10 Q. So it would be lower than that you would get in
11 a cigarette; correct?

12 MR. PLESEC: Objection.

13 A. I would have to go back and look at exact data.

14 It varies. It varies a lot obviously from city to
15 city. Heavily industrialized cities have more
16 benzopyrene in the air or polycyclics in general as
17 well as other things.

18 Q. So you have no opinion as to the level of
19 polycyclic hydrocarbons in the air in Minnesota;
20 correct?

21 MR. PLESEC: Objection.

22 A. I have no opinions about or no information about
23 the levels of polycyclic aromatic hydrocarbons in
24 Minnesota air as we sit here today.

25 Q. Do you plan to testify about that subject matter

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1 at trial?

2 A. I don't know. It might be possible.

3 Q. Excuse me?

4 A. I don't know. Maybe.

5 Q. Well, when do you expect to do that research?

6 A. If I in fact have to go to trial, I will do
7 research, whatever I -- whatever I have to, whatever
8 is necessary.

9 Q. Well would you please disclose to me the level
10 of benzopyrene in Minnesota if you plan to testify
11 about that at trial.

12 A. If I plan to testify about the level of BaP in
13 Minnesota air, that's up to my lawyer whether they
14 produce that to you.

15 MR. O'FALLON: Counsel, will you agree to
16 do that?

17 A. I'm not -- I'm not a lawyer.

18 MR. O'FALLON: If that's going to be -- I
19 mean, that was a part of his testimony down in
20 Florida. It's appended to his report, so I need to
21 know.

22 THE WITNESS: I beg your pardon. It was
23 not a direct part of my testimony other than that it
24 was present in air pollution. I didn't get into
25 levels of BaP in Florida air.

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1 Q. So are you just planning to state to the jury
2 here in Minnesota that there is benzopyrene in air
3 and then just leave it at that?

4 A. I'm not certain exactly what my testimony will
5 be in this Minnesota case yet.

6 Q. Do you have an opinion as to whether there's
7 more benzopyrene in the air in Minnesota than there
8 is in the standard cigarette?

9 A. I really would have to look at some numbers
10 before I answer that.

11 Q. So as you sit here --

12 A. It's been -- it's been a long time since I've
13 seen air pollution data.

14 Q. So as you -- well, how long? How long was it
15 before you --

16 When was the last time you saw air pollution
17 data before the Connor case?

18 A. I reviewed it for the Connor case.

19 Q. Okay. So you've seen it within the last five
20 months?

21 A. Uh-huh.

22 Q. But you can't recall --

23 A. That's reasonable.

24 Q. -- you can't recall the levels in Minnesota?

25 A. Can't recall specific numbers.

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1 Q. Did anything in your review of that literature
2 indicate that there was more benzopyrene in air
3 pollution and in the air than there was in a standard
4 cigarette?

5 A. I don't remember. I'd have to go back and look
6 at the data again.

7 Q. Did you ever suggest to the jury in the Connor
8 case that there was more benzopyrene in air than
9 there was in cigarette smoke?

10 A. I don't remember ever saying that.

11 Q. And you didn't intend to imply that if you did;
12 correct?

13 A. Certainly not.

14 Q. What's the total amount of benzopyrene and the
15 other aromatic polycyclic hydrocarbons that have been
16 identified by R.J. Reynolds as potential carcinogens
17 that a cigarette smoker is exposed to in his or her
18 lifetime?

19 A. Over the course of a lifetime?

20 Q. Over a lifetime.

21 A. Oh, I think that depends on the person, how much
22 they smoke, how often they smoke, the way they smoke,
23 how many years they smoke, what they smoke. It's a
24 pretty general question. I'm sorry.

25 Q. Well how much benzopyrene is contained in the

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1 average cigarette?

2 A. Benzopyrene is not contained in the average
3 cigarette or in any cigarette.

4 Q. It's not. Well how about the cigarette smoke
5 then? What's the average amount of benzopyrene
6 contained in the cigarette smoke of a standard R.J.
7 Reynolds Tobacco Company cigarette?

8 MR. PLESEC: Objection.

9 A. I can tell you for some specific brands. I
10 don't know what you -- if -- if -- if you're asking
11 for the average, I don't have an average number, but
12 I can give you typical values.

13 Q. Well, give me typical values.

14 A. For higher-tar products, benzopyrene levels will
15 be in the 10-, 12-to-maybe-13-nanogram-per-cigarette
16 range. The levels in the lower-tar products will go
17 down pretty much proportional -- proportional to tar
18 reduction.

19 Q. Okay. So the level of benzopyrene a smoker
20 receives is going to be dependent upon the level of
21 tar they receive; right?

22 A. The benzopyrene-to-tar ratio is a -- is
23 relatively constant pretty much across the product
24 range in the marketplace.

25 Q. So you would agree with my question, which is

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1 that the level of benzopyrene a smoker receives is
2 going to be dependent upon the level of tar they
3 receive; right?

4 MR. PLESEC: Objection.

5 A. I don't remember you -- you asking that
6 question.

7 Q. Well, then let me ask it again. Here was the
8 question I asked: So the level of benzopyrene a
9 smoker receives is going to be dependent upon the
10 level of tar they receive; correct?

11 A. I think to a degree or to a large degree the
12 benzopyrene-to-tar ratio is relatively constant
13 across commercial products.

14 Q. So a smoker's inhalation of tar will determine
15 their inhalation of benzopyrene?

16 A. In part, sure.

17 Q. And again that goes back to the whole notion
18 that you were never able to selectively remove
19 benzopyrene from the cigarettes; correct?

20 MR. PLESEC: Objection.

21 A. It goes back to the notion that we've been
22 unable to develop practical consumer acceptable means
23 to selectively reduce BaP at this point, but we have
24 effected a general reduction -- or through general
25 reduction we've effected a BaP reduction per

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1 cigarette.

2 Q. Now the --

3 A. So and it pretty much tracks the tar level.

4 Q. And the level of tar any individual smoker
5 receives is a function of the level of nicotine that
6 smoker receives; correct?

7 MR. PLESEC: Objection.

8 A. No, I don't think that's correct.

9 Q. It's not your understanding that cig --
10 cigarette smokers smoke for nicotine?

11 MR. PLESEC: Objection.

12 A. I think nicotine's important to the overall
13 smoking process and why people smoke. I don't think
14 it's the only reason.

15 Q. But you understand the general notion that
16 people smoke for a specific dosage level of nicotine,
17 don't you?

18 MR. PLESEC: Objection.

19 A. I think I understand the notion. I don't agree
20 with it, that that's the only reason people smoke and
21 that they smoke only for a certain dosage.

22 Q. And isn't it generally true that individual
23 smokers will basically smoke until they receive
24 whatever is their own individual dosage of nicotine
25 from whatever product they smoke?

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1 A. I don't think --

2 MR. PLESEC: Objection.

3 A. -- that's correct at all.

4 Q. We'll come back to that issue in some detail.

5 As part of your testing of the polycyclic
6 hydrocarbons, did you ever expose the lungs of
7 animals to polycyclic hydrocarbons in the same levels
8 that they occurred in cigarette smoke?

9 MR. PLESEC: Objection.

10 A. I'm not an expert in this area. I don't know
11 the details. I do know that there have been a lot of
12 attempts to do inhalation studies with cigarette
13 smoke, which would be benzopyrene levels at the
14 levels in cigarette smoke because that's what it is.

15 Q. Okay.

16 A. You're asking the wrong person, though.

17 Q. Has R.J. Reynolds ever exposed the lungs of
18 animals to the level of polycyclic hydrocarbons
19 available in cigarette smoke?

20 MR. PLESEC: Objection.

21 A. We've exposed animals to cigarette smoke.

22 Q. And when you expose animals to cigarette smoke,
23 what are the results?

24 MR. PLESEC: Objection.

25 A. Inhalation experiments with animals when exposed

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1 to cigarette smoke cause cellular changes in the
2 respiratory tract.

3 Q. And again what are those cellular changes?

4 MR. PLESEC: Objection.

5 A. I've already testified I don't know. I'm not an
6 expert in the area.

7 Q. And just so we're clear, when I asked you
8 whether or not R.J. Reynolds exposed animals to
9 polycyclic hydrocarbons at the level they were found
10 in cigarette smoke, your answer was to respond that
11 you had in fact exposed animals to cigarette smoke.
12 You would agree that it's the cigarette smoke
13 exposure that's the ultimate test; right?

14 MR. PLESEC: Objection.

15 A. What do you mean "the ultimate test"?

16 Q. The ultimate test of whether or not a product is
17 safer or dangerous.

18 A. I've already --

19 MR. PLESEC: Objection.

20 A. I've already told you I don't know how to
21 determine whether one product is safer than another.
22 There is no way to do that. It's been the subject of
23 a lot of discussions, including discussions we -- we
24 scientists at Reynolds have had with experts as part
25 of a Canadian Health Panel and a variety of other

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1 research discussions, the National Cancer Institute,
2 for example. There is no way to measure whether one
3 product is safer or -- or not than another.

4 Q. There's no way at all?

5 MR. PLESEC: Objection.

6 A. All I know is that biologists and toxicologists
7 who are far more knowledgeable in the area than either
8 you or I have agreed that there is no protocol that
9 would allow us to demonstrate that one product is
10 safe or safer than another.

11 Q. And when you're talking about products, are you
12 talking about cigarette smoke?

13 A. I'm definitely talking about cigarettes,
14 cigarette product designs.

15 Q. Of course --

16 MR. PLESEC: Take a lunch break, Dan?

17 MR. O'FALLON: One more question.

18 Q. The whole area of whether a product is or isn't
19 safer is kind of a sticky one for R.J. Reynolds since
20 they don't publicly admit that their products are
21 unsafe to begin with; correct?

22 MR. PLESEC: Objection.

23 A. I think R.J. Reynolds has made it very clear and
24 many individuals like myself and others have made it
25 very clear what our personal opinions are. Cigarette

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1 smoking is a risk for a number of diseases, including
2 lung cancer.

3 Q. But you're not willing to concede that it even
4 is probably the cause of lung cancer; correct?

5 MR. PLESEC: Objection.

6 A. That's not what I said.

7 Q. Are you willing to concede that cigarette
8 smoking is probably the cause of lung cancer?

9 A. I've made it very clear in testimony and I'll
10 make it here clear today cigarette smoking is a risk
11 for a number of diseases. It may well cause those
12 diseases or it may well cause some of those
13 diseases.

14 Q. Okay.

15 A. But we don't know.

16 Q. But my specific question is: Do you concede
17 that cigarette smoking is probably the cause of lung
18 cancer?

19 MR. PLESEC: Objection.

20 A. I don't know the answer to that question because
21 this is not my area and I would just be guessing. It
22 would be my personal opinion.

23 Q. Let's hear your personal opinion.

24 A. My personal opinion is that lung cancer and
25 other -- and many other chronic diseases are the

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1 result of lifelong exposure to a variety of things,
2 including -- which are a direct result of your
3 life-style. Smokers as a group tend to have higher
4 lung cancer rates. Smokers as a group also tend to
5 get less exercise. They also tend to have lousy
6 diets. They also tend to drink more than nonsmoker
7 groups.

8 There are many factors that over the course of a
9 lifetime probably make a difference to one's health,
10 and cigarettes are included in that. But to sit down
11 and specifically say is it probable that cigarette
12 smoking causes, I have a hard time with as a layman
13 in this field.

14 Q. Will you concede that cigarette smoking is a
15 substantial contributing factor to diseases such as
16 lung cancer?

17 MR. PLESEC: Objection.

18 A. I really don't know. I'm not an expert in this
19 area.

20 Q. As a layperson, will you concede that cigarette
21 smoking is a substantial contributing factor to
22 dis -- to diseases --

23 MR. PLESEC: Objection.

24 Q. -- such as lung cancer?

25 MR. PLESEC: Objection.

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1 A. I don't know. It may. I just really don't
2 know.

3 Q. And it may not?

4 A. It may. I don't know.

5 Q. There's still a doubt in your mind as to whether
6 or not cigarette smoking causes any disease;
7 correct?

8 A. I have told you my personal opinion. I believe
9 that chronic diseases like lung cancer are the result
10 of a lifetime -- lifetime of a certain way of living,
11 which includes cigarette smoking, exercise, diet,
12 general -- your entire -- your entire exposure across
13 a life and -- and the way you treat your body and the
14 way you take care of your body.

15 Q. My question was: Is there still a doubt in your
16 mind as to whether or not cigarette smoking causes
17 any disease?

18 A. And I'm telling you that these diseases I
19 believe are multifactorial, that many factors
20 determine whether or not a person gets a disease.
21 It's hard for me to sit down now and say specifically
22 that one or another of these factors in themselves
23 cause the disease, so the answer to your question is
24 I don't know.

25 Q. In other words, you still have a doubt as to

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1 whether cigarette smoking causes any disease;
2 correct?

3 A. I have just explained my position. I don't
4 know.

5 MR. PLESEC: Let's have a lunch break.

6 Q. And you would agree that that's a reasonable
7 opinion for someone to have, which is that I just
8 don't know?

9 A. I don't know what reasonable or not reasonable
10 is. All I know is it's my opinion I don't know, and
11 that's it.

12 Q. Do you consider yourself to be reasonable?

13 MR. PLESEC: Objection. Counsel, let's
14 take our lunch break. It's now --

15 MR. O'FALLON: I want an answer to this
16 question.

17 MR. PLESEC: -- almost 2 -- 1 o'clock.

18 MR. O'FALLON: I want an answer to the
19 question.

20 A. All right. I want you to be more specific. Are
21 you talking about me as a reasonable scientist, me as
22 a reasonable human being or what?

23 Q. Do you consider yourself to be a reasonable
24 human being?

25 A. I certainly consider myself to be a reasonable

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1 human being.

2 MR. O'FALLON: I have no further
3 questions. We'll stop for lunch.

4 THE REPORTER: Off the record, please.

5 (Luncheon recess taken at 12:54 o'clock
6 p.m.)

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1 AFTERNOON SESSION

2 (Deposition reconvened at 2:06 o'clock
3 p.m.)

4 BY MR. O'FALLON:

5 Q. Good afternoon, Dr. Townsend.

6 A. Good afternoon.

7 Q. Are you ready to proceed?

8 A. Yes, I am.

9 Q. I'd like to just go back and try to get a time
10 frame on the benzopyrene research that we've been
11 talking about. Approximately when did that selective
12 removal of benzopyrene research start?

13 A. I think the identification and quantification of
14 benzopyrene in smoke started in, best of my
15 recollection, '53, '54. The selective removal
16 approaches and the research and development on that
17 was, I would say, between the time period '54 to
18 pretty much the end of that decade.

19 Q. Okay. Was a decision reached in about the end
20 of that decade, the end of the 1950s, that a
21 commercially feasible product using selective removal
22 of benzopyrene was not possible?

23 A. No, we never really drew that conclusion at
24 all. We felt that it was unlikely, but I can tell
25 you that during my stay at Reynolds I've been active

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1 in trying to evaluate different ideas for selective
2 benzopyrene removal. So it's -- it's not a theory
3 that we've walked away from and shut the door on.
4 You know, we've continued to do -- do work on it.

5 Q. Okay. Was the major thrust of that effort,
6 though, was it basically terminated around the end of
7 the 1950s?

8 A. The intense work certainly -- I wouldn't say
9 terminated, but I think the intense work was -- was
10 pretty much stopped. For example, we built a large
11 pilot plant to do solvent extraction, and that work
12 was -- was pretty much finished at -- at the end
13 of -- the end of the '60s -- '50s, I'm sorry.

14 Q. Was that large pilot plant built in
15 Winston-Salem?

16 A. Yes.

17 Q. Was that plant subsequently used for something
18 else?

19 A. I'm not entirely sure.

20 Q. Is it still in existence; do you know?

21 A. No, it's not still in existence.

22 Q. Was there ever any product of any type or
23 material produced out of that pilot plant or not?

24 A. Well we had material produced out of that pilot
25 plant for experimental purposes.

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1 Q. For commercial --

2 A. Nothing -- nothing was ever made commercial out
3 of it.

4 Q. Okay. Did that plant continue to serve over
5 some period of time as a plant where you could
6 actually make some various experimental materials, or
7 once you made a shot at this selective removal and it
8 wasn't successful, did that basically just get
9 mothballed?

10 A. I don't really -- I don't really know whether it
11 was used for any other purpose or not. I'd only be
12 guessing. I really don't know.

13 Q. As I read your testimony in the past couple of
14 days, you kind of went through the various selective
15 removal procedures that R.J. Reynolds undertook, and
16 without ever you saying it, I -- it was kind of my
17 assumption that you were doing it in kind of a
18 chronological fashion. Is that true? Did it
19 basically go from a chronological point of view
20 benzopyrene, then phenols, then the ciliastats and
21 then nitrosamines in there somewhere?

22 A. That's generally correct.

23 Q. Okay.

24 A. That's pretty much a chronological description
25 of -- of the moving target, if you will.

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1 Q. When did the phenol effort under -- start?

2 A. Well it was -- it really started in, I would
3 say, the late '50s and continued on until the early
4 '60s, early to mid-'60s, and again like
5 benzopyrene, it's not theories that we've just
6 completely shut the door and walked away from, nor
7 has other people in the scientific community.

8 Q. Again I believe it's your opinion that phenols
9 were viewed as a cocarcinogen; correct?

10 A. That's correct.

11 Q. Would you just quickly define that for us.

12 A. Well again I'm not an expert in the area, but my
13 superficial understanding is that a cocarcinogen
14 would in fact increase the carcinogenic activity of
15 some initiator like benzopyrene.

16 Q. And as a cocarcinogen, would phenol have a
17 specific activity with one given carcinogen or would
18 it perform that function with any given carcinogen in
19 the tobacco smoke?

20 A. I really don't know.

21 MR. PLESEC: Objection.

22 Q. Are you familiar with the term "potentiate"?

23 A. Well I've heard the term. I'm not sure in -- in
24 what context.

25 Q. Have you ever heard it in the context of a

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1 cocarcinogen; that is, that a cocarcinogenic
2 substance potentiates a carcinogen?

3 A. Yeah, I'm not -- I've heard that term. I'm not
4 quite sure what that exactly means.

5 Q. Now it's my understanding that you were able to
6 selectively remove some phenols. Is that right?

7 A. Some of the more volatile phenols were removed
8 by selective techniques.

9 Q. And which -- which specific techniques did you
10 use?

11 A. Well particularly the use of cellulose acet --

12 MR. PLESEC: Dan, just for clarification,
13 when you say "you," are you talking about

14 Dr. Townsend --

15 MR. O'FALLON: R.J. Reynolds.

16 MR. PLESEC: -- or Reynolds?

17 MR. O'FALLON: R.J. Reynolds.

18 A. What we found as we -- as we identified and
19 quantitated levels of phenols was that there are
20 semi-volatile phenols and volatile phenols. Some of
21 the volatile phenols and a few of the semi-volatile
22 phenols were selectively removed by cellulose acetate
23 filters, particularly when those filters are
24 plasticized with compounds like triacetin, so phenol
25 itself and some of the more volatile phenols are

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1 removed much more efficiently than particulate
2 materials.

3 Q. Once you selectively removed these phenols, did
4 you ever -- and is it phenols or phenols? Which --
5 which is it?

6 A. I call them phenols, but -- most chemists will
7 call them phenols.

8 Q. Okay, then I'll call them phenols.

9 Once you had determined a way to selectively
10 remove these phenols, did you then test the smoke
11 from the cigarettes where you'd removed the phenols
12 against the smoke from a regular cigarette to
13 determine if one was less carcinogenic than the
14 other?

15 A. I'm -- I'm not aware of such testing. I don't
16 know. I don't know whether it was conducted or not.

17 Q. So even though Reynolds was successful in
18 removing some of the phenols, it was not clear as to
19 whether that had a beneficial effect on the ultimate
20 product, the cigarette smoke; correct?

21 MR. PLESEC: Objection, assumes facts not
22 in evidence.

23 A. I really don't know.

24 Q. Was the cell -- cellulose acetate filter
25 commercialized?

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1 A. Yes, it was already in place in the market.

2 Q. And what cigarettes did R.J. Reynolds put that
3 cellulose acetate filter on?

4 A. Well by the early '60s, we had a number of
5 products, Winston and Salem particularly. And there
6 were -- some of our lower-tar products like Vantage
7 were -- were not yet on the market, though. Salem
8 and Winston for sure.

9 Q. Other than the cellulose -- cellulose acetate
10 filter, did R.J. Reynolds institute any other methods
11 to remove phenols from cigarette smoke?

12 A. Other than the cellulose acetate filter with the
13 plasticizer -- because the plasticizer does have a
14 significant effect in itself.

15 Q. Okay.

16 A. Other than that selective reduction by the
17 filters for the volatile phenols, we weren't able to
18 find suitable selective means for the less-volatile
19 phenols. Phenols are generally products of lignin
20 combustion or pyrolysis, and so the backbone
21 structure of the tobacco leaf in fact is thought to
22 be precursors of phenols. We haven't figured out a
23 way to -- to reduce those levels.

24 Q. And it's my understanding that this filter did
25 not remove all of the phenols. Right?

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1 A. It removed only some of them, --

2 Q. Okay.

3 A. -- particularly the more volatile ones.

4 Q. Was testing ever done to determine which of the
5 phenols were considered to be more carc --
6 cocarcinogenic?

7 MR. PLESEC: Objection.

8 A. I can recall there was -- there has been some
9 work done outside of Reynolds looking at that, and
10 I -- I can't recall exactly the results.

11 Q. Okay. Did Reynolds ever do any work to
12 determine which of the phenols were the most
13 cocarcinogenic, the most problematic?

14 A. I'm not sure if Reynolds did any biological
15 studies to try to evaluate various phenols as
16 cocarcinogens. I know there was a lot of discussions
17 and -- and work with people outside of the company,
18 and of course I -- I guess really the -- the whole
19 notion that phenols as being promoters or
20 cocarcinogens, carcinogens, has really changed to a
21 degree, and I think people today in the scientific
22 community are really questioning phenols as a class
23 as to whether they may be cocarcinogens or may be
24 even good in the -- in the -- in the sense that
25 they're free-radical scavengers. I don't know.

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1 Q. How many phenols did R.J. Reynolds identify in
2 cigarette smoke?

3 A. Were we the first to identify?

4 Q. No. How many phenols total did RJR know about?

5 A. At what point in time?

6 Q. I believe you testified this research took place
7 in the '60s, so in the '60s when you were undertaking
8 to use the filter to remove some of them.

9 A. I would -- I would just have to guess. In the
10 early '60s I think we had identified and quantitated
11 certainly six or eight different phenols. Over the
12 years we find other phenols in smoke, and today we
13 know quite -- quite a large number of phenols. Again
14 they're decomposition products from the lignin, which
15 is the backbone of -- of tobacco, or one of the
16 backbones, along with cellulose.

17 Q. Approximately how many phenols in total has RJR
18 identified in cigarette smoke?

19 A. Altogether I really -- I'd have to go back
20 and do a count. I don't know, don't remember.

21 Q. More than 20?

22 A. I'd really have to go back and do a count. I
23 really don't remember.

24 Q. Of the phenols identified by R.J. Reynolds, how
25 many of those phenols are considered to be

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1 cocarcinogens?

2 MR. PLESEC: Objection.

3 A. I really don't know. This is -- this is not my
4 area.

5 Q. Do you know whether or not the car -- the
6 phenols that the filter was able to remove were
7 actually phenols considered to be cocarcinogens?

8 MR. PLESEC: Objection.

9 A. It's my understanding that phenol itself was
10 thought to be a possible cocarcinogen. I don't know
11 in fact whether it is or not, but I think it was
12 thought at the time. Hydroquinone or
13 dihydroxybenzene I believe was thought at the time to
14 be a cocarcinogen, and beyond that, you know, I'm --
15 I'm really outside my area.

16 Q. Did the filter remove phenol and the other
17 cocarcinogens you just identified?

18 A. I believe that -- well yes.

19 MR. PLESEC: Objection.

20 A. Cellulose acetate filter and triacetin
21 selectively removed phenol itself, the specific
22 phenol compound, and the dihydroxybenzene catechol.

23 Q. But obviously there were still phenols left in
24 the cigarette smoke; correct?

25 A. Of course.

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1 Q. And RJR did not test to determine whether the
2 cigarette smoke from the cigarettes containing the
3 cellulose acetate filter with the plasticizers was
4 either more or less active than the smoke from their
5 normal cigarettes; correct?

6 MR. PLESEC: Objection.

7 A. I'm not aware whether such testing was done or
8 not.

9 Q. Now after you worked on the removal of phenols,
10 RJR then turned its attention to ciliastatic
11 substances; correct?

12 A. Cilia --

13 MR. PLESEC: Objection.

14 A. Ciliastasis was the next major theory that --
15 that was considered in the scientific community.

16 Q. And again this would have been in addition to
17 the previously identified substances; correct?

18 MR. PLESEC: Objection.

19 A. If by "in addition to" you mean that the door
20 wasn't closed on the other theories, that's a true
21 statement.

22 Q. I mean, no one was suggesting that benzopyrene
23 and phenols were now okay; right?

24 MR. PLESEC: Objection.

25 A. Well I can tell you those of us at Reynolds

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1 never considered that benzopyrene and phenols and
2 those theories were dead theories. We've continued
3 to look at ways to reduce benzopyrene, phenols and
4 other things.

5 Q. Okay. So again, from R.J. Reynolds' point of
6 view, the target wasn't moving; it was simply
7 growing. Right?

8 MR. PLESEC: Objection.

9 A. I think there were multiple targets, and I think
10 the scientific community added new targets and many
11 people in the scientific community focused their
12 attention from one target to the next as the likely
13 culprits -- as the likely culprit. So I -- I think
14 there has been a moving target, and it's been a
15 moving target as new targets have been placed on the
16 field.

17 Q. Right. But the old targets have never left;
18 they still remain?

19 A. The old targets still remain as -- as theories
20 about why cigarette smoking is a risk.

21 Q. Okay. Now would you define for me what the
22 ciliastasis theory is.

23 A. Well the ciliastasis theory simply is that there
24 are suspected compounds in cigarette smoke that will
25 inactivate cilia, which are in the upper respiratory

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1 tract. The cilia or -- or hairlike -- well the cilia
2 or hair -- or essentially small hairs in the upper
3 respiratory tract that for the most part will beat in
4 unison and provide a clearance mechanism for the
5 upper respiratory tract, the speculation was that
6 some constituents in smoke will deactivate those
7 cilia, inactivate, even if temporarily, one of the --
8 one of the respiratory tract's clearance mechanisms,
9 thereby increasing the exposure to smoke condensate.

10 Q. Okay. What substances were thought to paralyze
11 the cilia in the respiratory tract?

12 A. Well there were a number. The majority of them
13 are in a class of compounds called carbonyls or
14 aldehydes, compounds like acrolein, acetaldehyde. I
15 think acetic acid was at once considered a cilia -- a
16 possible ciliastat. Phenol is considered to be a
17 ciliastat by some. Nitric oxide is thought by some
18 to be a ciliastat, so it's a wide variety of
19 constituents.

20 Q. So the number of constituents that are becoming
21 of concern to the health community as related to
22 cigarettes are really growing exponentially;
23 correct?

24 A. Well I don't --

25 MR. PLESEC: Objection.

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1 A. I don't know exponentially. It's certainly
2 growing.

3 Q. We've now added a whole new level of compounds
4 that are of concern; correct?

5 MR. PLESEC: Objection.

6 A. There's a number of new constituents that became
7 constituents of concern because of the ciliastasis
8 theory.

9 Q. Did R.J. Reynolds ever do any in-house testing
10 to determine whether any of these substance were
11 ciliastatic? Is that a correct term, by the way,
12 "ciliastatic"?

13 A. "Ciliastatic," I believe it is.

14 Q. Okay. And that means preventing the cilia from
15 moving basically?

16 A. Uh-huh, right.

17 Q. Did R.J. Reynolds ever do any in-house research
18 to determine whether any of these compounds were in
19 fact ciliastatic?

20 A. I'm not aware of any direct biological research
21 to determine if individual constituents were or were
22 not ciliastatic. I think there was a fair amount of
23 research done external to R.J. Reynolds that we were
24 aware of that looked at a variety of smoke
25 constituents.

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1 Q. But R.J. Reynolds never did any independent
2 testing to determine if the individual constituents
3 you identified, the acetaldehyde, acrolein, nitric
4 oxide or phenols, were in fact ciliastatic?

5 MR. PLESEC: Objection.

6 A. From my -- from my reading of the literature,
7 the internal literature of that time, and from
8 talking with other scientists at Reynolds who were
9 present, I think we assumed that they were in fact
10 ciliastats. I'm not aware of biological testing to
11 evaluate whether they were or not.

12 Q. Well don't you have to know whether they're
13 ciliastatic before you undertake an effort to remove
14 them?

15 MR. PLESEC: Objection.

16 A. I don't agree with that at all. I think if --
17 if there's a theory that is a reasonable theory in
18 the scientific community, one can go about their job
19 of designing new products or modifying products to
20 address that theory assuming that the theory is
21 correct, and that's exactly what we did. We assumed
22 that the ciliastasis theory was correct, that those
23 constituents thought to be ciliastats were in fact
24 that, and we went ahead to try to figure out ways to
25 reduce or eliminate those compounds.

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1 Q. But don't you run the risk if you don't do your
2 own research and determine what substances are
3 ciliastatic that you're going to remove a substance
4 that it turns out didn't have that effect?

5 A. Well there's always that potential.

6 Q. Or only had -- or was only part of the cause of
7 the effect?

8 A. There's always that potential.

9 Q. Now it's my understanding that R.J. Reynolds
10 introduced a product called Tempo that addressed
11 these concerns.

12 A. That's correct.

13 Q. How did Tempo address those concerns?

14 A. Well Tempo, because of its carbon filter, did
15 remove selectively a large number of carbonyls,
16 particularly carbonyls, like acrolein, acetaldehyde,
17 as well as many other compounds like isoprene, which
18 were also thought to be ciliastats.

19 Q. Did it remove all of the potential ciliastats?

20 A. I don't think it removed any of them. It had
21 major reductions in many of them.

22 Q. So the ciliastatic substances remained, just in
23 reduced amounts?

24 A. Significantly reduced amounts.

25 Q. Were tests then conducted to determine whether

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1 the smoke from a Tempo cigarette actually had reduced
2 ciliastatic activity?

3 MR. PLESEC: Objection.

4 A. I'm not entirely sure, don't know.

5 Q. So once again, even though these substances were
6 removed, you can't tell me whether or not the Tempo
7 cigarette was effective in addressing the actual
8 problem, which was the paralysis of the cilia in the
9 upper respiratory tract; correct?

10 MR. PLESEC: Objection.

11 A. I'm not an expert in this field. I don't know
12 everything that went on or has -- has been done in --
13 in the biology, so I don't know whether Tempo
14 cigarettes were evaluated to determine whether that
15 reduced the ciliastatic potential of cigarette
16 smoke.

17 Q. So again it's entirely possible that Tempo had
18 absolutely no effect on reducing the ciliastatic
19 activity of cigarette smoke; correct?

20 A. I don't know. I think what we did do was we
21 reduced the levels of those compounds that the
22 scientific community was pointing at as being
23 involved in the ciliastasis theory. I don't know
24 whether or not Reynolds or even outside contractors
25 evaluated the ciliastatic potential of smoke from a

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1 Tempo. I just simply don't know. It may have been
2 done or it may not have been done. I don't know.
3 Q. But this is an instance in which you start with
4 an endpoint, a biological endpoint, called
5 ciliastasis in which the cilia are being hindered in
6 their activity and you're trying to address that
7 biological endpoint. In order to address that
8 biological endpoint, don't you have to at some point
9 test your final product, the Tempo cigarette, to
10 determine if in fact you've effectuated the change
11 you wanted to effectuate; that is, that you've
12 actually reduced the ciliastatic action of cigarette
13 smoke?

14 A. Your outline --

15 MR. PLESEC: Objection. Go ahead.

16 A. Your outline seems reasonable to me. However,
17 as a chemist I can tell you that my job and I think
18 the product developer's job is to look at using the
19 theory as a guide to what to reduce in cigarette
20 smoke, figure out how to reduce those constituents.

21 Again I don't know whether biological testing
22 was done or not. I certainly accept your general
23 theory of coming back, evaluating with biology
24 whether you've done anything useful. That brings me
25 full circle to some of the testimony this morning

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1 about how chemistry and biology is critical to our
2 overall product modification program at Reynolds
3 today.

4 Q. And the point is, is that at some point while
5 you're only a chemist, R.J. Reynolds is not a
6 chemical company; they're a cigarette company. And
7 what they have to do at some point is look at
8 biological endpoints if they're going to actually put
9 a product on the market that does address the health
10 concerns; correct?

11 MR. PLESEC: Objection.

12 A. I'm telling you that we look at both chemistry
13 and biology for new product development at Reynolds
14 today.

15 Q. But as you sit here today, you can't tell me
16 that Tempo was effective at all in reaching the
17 endpoint that was apparently shot at, which was the
18 endpoint of reducing the ciliastatic effect of
19 cigarette smoke; correct?

20 MR. PLESEC: Objection, asked and
21 answered.

22 A. Tempo reduced the chemistry significantly. I
23 don't know whether those experiments were done to
24 measure ciliastatic potential.

25 Q. And you'll agree with me that reducing the

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1 chemistry per se is really irrelevant if you don't
2 effectuate the ultimate change; that is, reducing the
3 ciliastasis effect; correct?

4 MR. PLESEC: Objection.

5 A. To the extent that the ciliastasis theory is a
6 correct theory. I mean, we still don't know the
7 relative importance of that theory in the whole
8 scheme of things.

9 Q. Okay. So number --

10 A. I do believe that reducing chemistry in itself
11 is the -- is the right direction to go. I do think
12 that some biological measures of progress are very
13 important, and all I'm saying is for the ciliastasis
14 theory, I don't know whether those experiments were
15 done or not. That was quite a while ago.

16 Q. So let's just outline Reynolds' program on
17 ciliastasis. Number one, you never determined
18 whether cigarette smoke was in fact ciliastatic;
19 correct?

20 A. I said I don't know.

21 Q. You removed some substances that were thought to
22 be ciliastatic, but no one ever tested to determine
23 whether they were in fact ciliastatic; correct?

24 MR. PLESEC: Objection.

25 A. I don't think that's what I said.

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1 Q. No one at Reynolds ever undertook research to
2 determine whether the substances you actually removed
3 were in fact ciliastatic; correct?

4 MR. PLESEC: Objection, assumes facts not
5 in evidence, --

6 A. I'm not --

7 MR. PLESEC: -- mischaracterizes
8 testimony.

9 A. I'm not an expert in this area. I don't know to
10 what extent scientists outside of Reynolds or inside
11 of Reynolds tested the ciliastatic potential of
12 individual constituents, tested the ciliastatic
13 potential of cigarette smoke or tested products with
14 reduced levels of carbonyls and other cilia --
15 potential ciliastats. I don't know. This is outside
16 my area.

17 Q. Okay.

18 A. But I do know we had a chemistry reduction and a
19 significant chemistry reduction in the Tempo.

20 Q. But you can't tell me whether that chemistry
21 reduction had any effect in ultimately reducing or
22 addressing the problem of ciliastasis; correct?

23 MR. PLESEC: Objection. He's asked and
24 answered -- it's been asked and answered.

25 A. I again am not an expert in this area. I think

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1 there are other people at Reynolds who can -- can
2 answer your questions about the biology of -- of --
3 from that point of history -- at that point of
4 history far better than I can.

5 Q. So at trial when you testify as an expert on
6 this subject, the only thing you're going to be able
7 to testify to is that certain chemicals which
8 outsiders identified as ciliastatic were removed, but
9 that you can't say whether they were ciliastatic or
10 whether the removal of them had any effect in
11 reducing ciliastasis of smoke from R.J. Reynolds'
12 tobacco products; correct?

13 MR. PLESEC: Objection.

14 A. I think the transcript that you've got in front
15 of you makes it clear that we used the ciliastasis
16 theory as a guide. We took that theory and sought to
17 address ways to reduce constituents that were thought
18 to be ciliastats. I don't think in the testimony I
19 made any reference or implication to biological
20 results of that chemistry reduction.

21 Q. Well to go back to your analogy of a silver
22 bullet, on the whole notion of ciliastasis, Reynolds
23 was kind of shooting in the dark, weren't they?

24 MR. PLESEC: Objection.

25 A. I don't know what you mean.

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1 Q. Well, you didn't know whether what you were --
2 were removing was ciliastatic, and once you removed
3 it, you didn't know whether in fact it reduced
4 ciliastasis; right?

5 A. I said I -- I testified, answered to one of your
6 questions just a minute ago that I don't know. I
7 personally don't know. I said we would have to go to
8 somebody who knows biology far better than I do, who
9 knows a lot more details of what Reynolds has done,
10 and I don't think that's to imply what you've just
11 suggested in your question, which is that Reynolds
12 doesn't know. I'm saying I don't know.

13 Q. Well, sir, as I understand it, there's no other
14 expert being put up who's from R.J. Reynolds. Isn't
15 that true?

16 A. In --

17 MR. PLESEC: Objection.

18 A. In what area?

19 Q. In any area. Aren't you the only R.J. Reynolds
20 employee who's an expert?

21 A. I don't know. I don't know the details of this
22 case.

23 MR. O'FALLON: It's true; right?

24 MR. PLESEC: In cigarette design issues?

25 MR. O'FALLON: In anything, in any of these

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1 issues. This is the only employee you've identified
2 as an expert; correct?

3 MR. PLESEC: I don't know the answer to
4 that question quite frankly.

5 MR. O'FALLON: You don't know the answer to
6 the question of whether there's any other R.J.
7 Reynolds expert that's been disclosed, not -- not an
8 RJR expert, but an RJR employee who's going to
9 testify?

10 MR. PLESEC: On any subject?

11 MR. O'FALLON: Yeah.

12 MR. PLESEC: Advertising, or how are you
13 limiting this?

14 MR. O'FALLON: Well health. I mean,
15 he's -- we're talking about biological endpoints.

16 Have you --

17 MR. PLESEC: Right.

18 MR. O'FALLON: -- got an RJR person who's
19 going to testify as to biological endpoints or not?
20 If not, that's fine.

21 MR. PLESEC: Well I -- I don't know who is
22 on the -- the list that would fit that -- that
23 description at this point. Quite frankly I don't
24 know.

25 MR. O'FALLON: I was under the

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1 understanding that Dr. Townsend was the only RJR
2 employee who was identified as an expert.

3 MR. PLESEC: Dr. Townsend is an RJR
4 employee who has been identified as an expert on
5 cigarette design issues.

6 MR. O'FALLON: So you're not going to
7 answer my question, are you?

8 MR. PLESEC: Well it --

9 MR. SIMONSON: Whatever we've designated,
10 we've designated.

11 MR. PLESEC: It's -- his -- his report
12 outlines his testimony. That report attaches to it
13 the testimony he gave in the Connor case, also called
14 the Raulerson case, and the -- the scope of his
15 testimony is fairly well described in that
16 testimony.

17 BY MR. O'FALLON:

18 Q. Well it's under --

19 It's my understanding that one of the opinions
20 that you're going to express here at the trial is
21 that you have a strong opinion that Reynolds has been
22 responsive to the smoking-and-health issues and has
23 provided the consumer with a broad range of products
24 that directly address the smoking-and-health issue.

25 Is that correct?

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1 A. That's correct.

2 Q. Isn't it kind of hard to say that a product
3 directly addresses the smoking-and-health issue if
4 you don't know what end product that product
5 reaches?

6 A. I think there's -- there's two aspects to that
7 particular statement that you read. The first is
8 we've used smoking-and-health issues to guide product
9 development efforts, and we've done everything we
10 know how to do to modify tobacco burning products to
11 respond to those -- to those theories, --

12 Q. Okay.

13 A. -- those issues, so that's a response to the
14 smoking-and-health issue.

15 We've gone beyond that, particularly in recent
16 years, in developing other products, particularly
17 tobacco heating products, that directly address
18 smoking-and-health issues, and we've developed
19 significant reductions in biology and have thoroughly
20 characterized the overall products.

21 Q. Is Tempo a cigarette that directly addresses the
22 smoking-and-health issue?

23 A. I believe it does because it responds to that
24 one theory.

25 Q. Okay. But again, you can't tell me that -- that

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1 the one problem it was supposed to address,
2 ciliastasis, you can't tell me whether it had any
3 effect on that problem; correct?
4 A. That's because I'm telling you I don't know
5 whether that experiment was done or not. It may have
6 been.
7 Q. Well --
8 A. Or it may not have been.
9 Q. If you --
10 A. But the theory pointed to certain constituents
11 in mainstream smoke as potentially being a problem,
12 so we tried to reduce the levels of those -- of those
13 constituents in smoke.
14 Q. Without knowing whether or not Tempo reduced
15 ciliastasis, you can't testify that it's a product
16 that directly addresses the smoking-and-health issue
17 now, can you?
18 MR. PLESEC: Objection.
19 A. I would testify that that product directly
20 responds to that theory, which is part of the
21 smoking-and-health issue.
22 Q. A theory you didn't test on the front end or the
23 back end; correct?
24 A. I didn't say whether we -- I didn't say we
25 didn't. I said I don't know whether we did or not.

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1 Q. So you can't testify that you addressed it on
2 the front end or the back end; correct?

3 MR. PLESEC: Objection.

4 A. I'm saying as I sit here today, I don't know the
5 details about whether ciliastasis for Tempo was
6 evaluated or not.

7 Q. And as a result of the fact that you don't know
8 that information, you can't testify that Tempo did in
9 fact reduce ciliastasis; correct?

10 MR. PLESEC: Objection, asked and
11 answered.

12 A. I mean, I'm not sure what more you want from
13 me. I mean, I've tried to answer your question.

14 Q. Well why don't you answer this one. Would you
15 like it read back?

16 A. Please.

17 Q. And as a result of the fact that you don't know
18 that information; that is, you don't know whether or
19 not testing was done on ciliastasis, you can't
20 testify that Tempo did in fact reduce ciliastatic
21 activity; correct?

22 MR. PLESEC: Objection.

23 A. I don't know whether ciliastasis tests were
24 conducted on Tempo or not as we sit here today. As a
25 result of this discussion, you can be sure I'll find

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1 out whether we did it or not.

2 Q. As a result --

3 Due to the fact that you don't know the
4 endpoints, you can't testify as you sit here today
5 that Tempo in fact reduced ciliastatic activity;
6 correct?

7 A. Because I'm not aware of whether we've conducted
8 research or not, I can't tell you -- on -- on Tempo,
9 I can't tell you whether Tempo as a finished product
10 reduced ciliastasis.

11 Q. And so I can't cross-examine your opinion until
12 you go back and educate yourself; right?

13 MR. PLESEC: Objection. You are
14 cross-examining right now.

15 MR. O'FALLON: Well but I'm not coming
16 anywhere. Every time I ask a question, I'm told, "I
17 don't know."

18 Q. So do you plan to go back after this deposition
19 and educate yourself about that research and then
20 come and testify to the jury in this case that Tempo
21 either did or did not increase or decrease the
22 ciliastatic activity of the cigarette smoke?

23 MR. PLESEC: Objection.

24 A. I certainly have a curiosity. My plan is to go
25 back and look at what Reynolds has done to evaluate

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1 Tempo cigarettes.

2 Q. Are you then going to append your report?

3 MR. PLESEC: Objection.

4 A. I don't know how one does that.

5 Q. Well you do an addendum. Will you agree with me
6 that if you go back and change your opinion and
7 decide to have an opinion on whether Tempo does in
8 fact reduce ciliastasis, that you will write an
9 amend -- addendum and send it to counsel for the
10 State of Minnesota so that we can be aware of your
11 opinions and the basis of those opinions?

12 MR. PLESEC: Objection.

13 A. Let me see if I understand. If I go back and
14 educate myself on detailed experiments that Reynolds
15 may have done to compare or evaluate Tempo as a
16 finished cigarette, final design, and its effect on
17 ciliastasis compared to some reference product, if I
18 intend to use that information in trial, you want to
19 know if I will append my expert report?

20 Q. Right.

21 A. My personal opinion is I don't see why not.

22 Q. Okay. And if I don't receive such an addendum,
23 can I assume that you will either not be testifying
24 on whether or not Tempo reduced ciliastatic activity
25 or you will stick with whatever it is you've said

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1 here today, which is that you simply don't know?

2 MR. PLESEC: Objection. You'll be properly
3 advised of any changes, Counsel.

4 MR. O'FALLON: Would you please answer the
5 question.

6 THE WITNESS: I'm sorry, could you read it
7 again.

8 Q. And if I don't receive any such addendum, can I
9 assume that you will either not be testifying on
10 whether or not Tempo reduced ciliastatic activity or
11 that you will stick with what you've said here today,
12 which is simply that you don't know whether it
13 reduced ciliastatic activity?

14 A. I think what I've said today is I don't know
15 whether those experiments were done or not, so I
16 don't know.

17 Q. Well and if you don't know whether those
18 experiments were done, you also don't know whether it
19 reduced ciliastatic activity; right?

20 A. Right.

21 Q. Okay. I'm going to show you a document that's
22 been previously marked in this litigation as
23 Plaintiffs' Exhibit 1106. Actually why don't you
24 hand me that back. That might be -- let me make sure
25 that's not mine. It's not. Thanks.

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1 This is a document that's Bates stamp numbered
2 51559 6267 through 2673. Have you seen this document
3 previously?

4 (Witness reviews Plaintiffs'
5 Exhibit 1106.)

6 A. I've skimmed this briefly. I don't remember
7 ever seeing this document.

8 Q. When you marketed Tempo, how did you market it;
9 do you recall?

10 MR. PLESEC: Objection, assumes facts not
11 in evidence.

12 Q. When I say "you," I'm referring to R.J.
13 Reynolds.

14 A. Yeah.

15 Q. Do you recall how R.J. Reynolds marketed that
16 cigarette?

17 A. I don't remember the specific ad copy or tag
18 lines. I do know it was clearly marketed as a
19 carbon-filtered cigarette.

20 Q. And was the implication there that it was a
21 safer cigarette because it was carbon filtered?

22 MR. PLESEC: Objection.

23 A. The implication to the smokers?

24 Q. Yes.

25 A. An implied message?

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1 Q. Yes.

2 A. I don't know what smokers took from those ads or
3 any other carbon-filtered ads. I know that there was
4 a report in the popular press or several reports in
5 the popular press, notably one in Reader's Digest,
6 that spoke to -- spoke to ciliastasis and carbon
7 filters removing some of the ciliastats. I don't
8 know what -- to what degree smokers may have taken
9 away an implied health message.

10 Q. Would it have been reasonable for smokers upon
11 reviewing the various ad campaigns for Tempo to have
12 concluded that the Tempo cigarette was somehow better
13 for them?

14 MR. PLESEC: Objection. It's way outside
15 the scope of his testimony as a cigarette design
16 issue expert.

17 A. You know, again I really don't know what implied
18 message, if any, any of the smokers took from any of
19 the advertisements. I just really don't know.

20 Q. I'd like you to look briefly at the first full
21 page of this document, Bates number 51559 6268. Are
22 you on the first page?

23 A. I'm on that page.

24 Q. This is a report from the biological research
25 division at R.J. Reynolds; correct?

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1 A. It says "MONTHLY" --

2 MR. PLESEC: Well I object.

3 MR. O'FALLON: What's your objection?

4 MR. PLESEC: Well what's -- what's the
5 foundation?

6 MR. O'FALLON: That's what I'm laying right
7 now.

8 MR. PLESEC: Okay. Proceed.

9 MR. O'FALLON: Okay.

10 BY MR. O'FALLON:

11 Q. This is a report from the biological research
12 division of R.J. Reynolds; correct?

13 A. Well --

14 MR. PLESEC: Are you saying correct, is
15 that what you're -- is that what the document says,
16 or does he know this to be the fact?

17 MR. O'FALLON: Well the document clearly
18 says that. If he thinks that it -- it doesn't mean
19 that, we'll -- let me ask it again.

20 Q. The document says that this is from the
21 biological research division of R.J. Reynolds;
22 correct?

23 A. At the top it says -- this document says
24 "MONTHLY RESEARCH" -- "RESEARCH REPORT, Biological
25 Research Division."

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1 Q. And it's marked "RJR CONFIDENTIAL"; correct?

2 A. Oh, that's correct.

3 Q. That would be a marking that's an on R.J.

4 Reynolds internal document; correct?

5 A. Many of the internal RJR documents internal are
6 marked "CONFIDENTIAL."

7 Q. I guess my point is: You wouldn't find a
8 document outside the company that would probably be
9 marked "RJR CONFIDENTIAL"; right?

10 A. We've got millions of pages scattered all over
11 the country now.

12 Q. But they're all originally from your files;
13 correct?

14 A. Sure.

15 MR. PLESEC: Objection.

16 Q. And what I'm really trying to establish with
17 you, Doctor, is: This appears to be a document from
18 R.J. Reynolds' files and specifically from the
19 biological research division of R.J. Reynolds;
20 correct?

21 A. Yes.

22 MR. PLESEC: Objection.

23 A. That's what it appears to be.

24 Q. Okay. Do you know who Eldon D. Nielson is?

25 A. I've heard the name, but I've never met the

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1 person.

2 Q. Okay. And it's to a Dr. Murray Senkus;
3 correct?

4 A. That's correct.

5 Q. He was the director of research at this time
6 period, August 26, 1968; correct?

7 A. This document says he was director of research
8 at that time.

9 Q. Okay. And I'd like you to go down to --

10 And this is a monthly research report; correct?

11 A. It says it's a month -- "MONTHLY RESEARCH
12 REPORT, Biological Research Division, 1968,
13 Number 8."

14 Q. Which would suggest there's at least seven more
15 of these someplace; correct?

16 MR. PLESEC: Objection.

17 A. Well, I would assume so.

18 Q. Have you seen other documents similar to this
19 from this time period from the biological research
20 division?

21 A. I can't recall ever seeing a document of this
22 sort from biological research division.

23 Q. Okay. Is this a document that you had the
24 opportunity to look at prior to your deposition here
25 today?

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C O N F I D E N T I A L

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1 MR. PLESEC: Objection. I believe that --

2 A. I --

3 MR. PLESEC: -- the testimony was that he
4 hadn't seen it.

5 A. Yeah, I haven't seen this document before just
6 now.

7 Q. Let's look under number II, "Smoking Rats." It
8 appears that the smoking rats had been exposed -- had
9 been exposed to smoke from the Tempo cigarette;
10 correct?

11 MR. PLESEC: Objection.

12 A. Well let me read that paragraph.

13 (Witness reviews Plaintiffs'
14 Exhibit 1106.)

15 Q. Why don't we go ahead and read that so the jury
16 has the benefit of that. Under Roman numeral II,
17 "Smoking Rats," it states "The chronic exposure of
18 rats to smoke is continuing"; correct?

19 A. Well I was trying to finish up reading this, but
20 I'll step back with you.

21 Q. "... is continuing"; correct?

22 A. The first --

23 MR. PLESEC: Why don't you start over,
24 Counsel, --

25 Q. It says --

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1 MR. PLESEC: -- keep it clean.

2 Q. Under Roman numeral II, "Smoking Rats," it
3 states that "The chronic exposure of rats to smoke is
4 continuing"; correct?

5 A. That's what it says.

6 Q. It says "The number of exposures was increased
7 to two a day on July 16, 1968"; correct?

8 A. That's what it says.

9 Q. It says "Three rats were lost after bleeding";
10 right?

11 A. That's what it says.

12 Q. It says "Tissues were taken for histology. No
13 gross pathology was noted"; correct?

14 A. You read that correctly.

15 Q. It then says that "The histology of the tissues
16 from the rat which had smoked TEMPO cigarettes via an
17 indwelling tracheal cannula has been completed with
18 the results given on the following page"; correct?

19 A. You read that correctly.

20 Q. And those results are number one, "A diffuse,
21 marked emphysema throughout the lungs"; correct?

22 A. You read that right.

23 Q. Did R.J. Reynolds ever take out advertisements
24 and tell the smoking public that rats exposed to
25 Tempo smoke had developed emphysema?

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1 MR. PLESEC: Objection, foundation, assumes
2 facts not in evidence.

3 A. I'm not aware of such a -- such an
4 advertisement.

5 Q. Has R.J. Reynolds ever told the public at all
6 that rats exposed in its laboratories to cigarette
7 smoke developed emphysema of the lungs?

8 MR. PLESEC: Objection.

9 A. I'm not aware of that. This is way outside my
10 area. I --

11 Q. Don't you think this is important information
12 for someone to know?

13 MR. PLESEC: Objection.

14 A. It's hard for me to -- to judge that because
15 these are research results. I don't even understand
16 what an indwelling tracheal cannula is. I don't know
17 what that is, what that procedure is, whether -- what
18 impact that may have had on the results of this kind
19 of experiment. I have no idea.

20 Q. In any event, it appears that the testing you
21 did do of Tempo would suggest that in fact some
22 rather serious health problems result from having a
23 laboratory animal exposed to the smoke from that
24 cigarette; correct?

25 MR. PLESEC: Objection.

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1 A. I can't make a judgment about the four
2 conclusions that are written here because I don't
3 know what this experiment is. I'm not an expert in
4 the field.

5 Q. The other results were there was a "Deposition
6 of pigment," parenthetical, "(tars?) in lung tissue,
7 mediastinal lymph nodes and tracheal adnexia";
8 correct?

9 MR. PLESEC: Objection.

10 A. I believe you read that correctly.

11 Q. There was also a lymphocytic infiltration;
12 correct?

13 A. You didn't read that correctly.

14 Q. Lympho --

15 There was "Lymphocyte infiltration"; correct?

16 A. That's correct.

17 Q. And there was "Frequent epithelial hyperplasia
18 in trachea and bronchioles"; correct?

19 MR. PLESEC: Objection.

20 A. You read that correctly.

21 Q. But none of that information has any real
22 meaning to you; correct?

23 A. I don't understand this experiment. I don't
24 understand what these conclusions mean.

25 Q. You understand that emphysema is one of the

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1 diseases that the scientific community -- scientific
2 community claims is caused by cigarette smoke;
3 correct?

4 MR. PLESEC: Objection.

5 A. I understand that emphysema is a -- is a chronic
6 disease that -- that is -- and cigarette smoking
7 is -- is definitely related to that disease. I don't
8 know whether this is in fact the same type of
9 emphysema that's being referred to. I just have no
10 idea.

11 Q. In any event, it would appear that cigarette
12 smoking in an animal model in RJR's own laboratories
13 has produced this emphysema; correct?

14 MR. PLESEC: Objection.

15 A. But I just said I don't know what kind of
16 emphysema this is, whether it's the same kind of
17 emphysema or not. I'm not aware -- I mean, I'm not
18 familiar with this -- this particular test protocol.
19 I don't know what a tracheal cann -- cannula is. I
20 have no idea what this means.

21 Q. Is it your understanding that there are
22 different types of emphysema?

23 A. I don't know. I'm not an expert in the area. I
24 know emphysema in humans is a chronic disease that
25 develops over many, many, many years. I don't know

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1 whether this is related to that. I just don't know.

2 Q. And is this the first time, today, that you
3 ever -- have ever seen the results of biological
4 testing on a Tempo cigarette?

5 MR. PLESEC: Objection.

6 A. As far as I can recall, this is the first time
7 I've ever seen anything like this.

8 Q. I'd next like to turn to the subject of
9 nitrosamines. Nitrosamines are known carcinogens;
10 correct?

11 A. Excuse me, are you through with this document?

12 Q. I am.

13 MR. PLESEC: Objection.

14 A. I'm sorry, the question was --

15 Q. Nitrosamines are known carcinogenic agents;
16 correct?

17 MR. PLESEC: Objection.

18 A. Some nitrosamines are thought to be carcinogenic
19 under some conditions.

20 Q. What is your understanding about when R.J.
21 Reynolds first learned that nitrosamines may exist in
22 tobacco smoke?

23 A. I don't know when Reynolds first learned that
24 nitrosamines might be present in cigarette smoke and
25 I -- I don't recall the exact date that we started

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1 analyzing cigarette smoke for nitrosamines, but we
2 did begin analyzing cigarette smoke for
3 nitrosamines. So I don't -- I don't know the exact
4 date.

5 Q. I'm going to hand you a document that's been
6 previously marked as Plaintiffs' Exhibit 1052.

7 Plaintiffs' Exhibit 1052 is a document Bates stamp
8 numbered 50101 3277.

9 Have you seen this document previously?

10 A. I've skimmed this document previously, yes.

11 Q. Okay. The date of this document is August 31st
12 of 1964; correct?

13 A. That's the date.

14 Q. And it's a memo from a Dr. Alan Rodgman in the
15 research department to Mr. Charles B. Wade, Jr.;
16 correct?

17 MR. PLESEC: Objection.

18 A. That's what it says.

19 Q. When did you first learn of this document?

20 A. I saw this document in the documents that was
21 produced by you.

22 Q. You'd never seen this document before that
23 time?

24 A. No.

25 Q. This document indicates that at least by 1964

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1 RJR was well aware of the presence of nitrosamines in
2 cigarette smoke; correct?

3 MR. PLESEC: Objection.

4 (Witness reviews Plaintiffs'
5 Exhibit 1052.)

6 A. Okay. I'm sorry, I was reading it. Your
7 question again was what?

8 Q. My question was that by this date, August 31st,
9 1964, R.J. Reynolds scientists were well aware of the
10 presence of nitrosamines in cigarette smoke.

11 Correct?

12 MR. PLESEC: Objection.

13 A. I think that my general opinion is that volatile
14 nitrosamines were thought to be present in cigarette
15 smoke from the late '50s, early '60s. I think
16 tobacco-specific nitrosamines came somewhat later,
17 probably in the mid to late '60s. Developing test
18 methods to determine the levels in cigarette smoke,
19 scientists at Reynolds worked very hard on that.

20 Q. Dr. Rodgman states in the first paragraph that,
21 quote, "I was already aware of the reported isolation
22 of nitrosamines from cigarette smoke by Serfontein
23 and Hurter in South Africa"; correct?

24 MR. PLESEC: Objection.

25 A. That's what it says.

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1 Q. It says "Dr. Colby has written for further data
2 so that we can" address "the strength of the chemical
3 evidence on hand"; correct?

4 MR. PLESEC: Objection.

5 A. That's what it says.

6 Q. "In addition, the following note appeared in the
7 41st Annual Report of the British Empire Cancer
8 Campaign on nitrosamines possibly present in" -- "in
9 tobacco smoke," and he then cites that; correct?

10 A. That's what it says.

11 MR. PLESEC: Objection.

12 Q. Specifically the article he cites is entitled
13 "The Carcinogenicity of Nitrosoanabasine, a Possible
14 Constituent of Tobacco Smoke"; correct?

15 A. That's what it says.

16 Q. He then states that "Many nitrosamines have been
17 shown to be carcinogenic for different organs in
18 several species of animals"; correct?

19 MR. PLESEC: Objection.

20 A. That's what he says.

21 Q. So apparently there had been wide-range testing
22 of nitrosamines in several organs of several animals;
23 correct?

24 MR. PLESEC: Objection.

25 A. Well again I'm not an expert in this area. I

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1 don't know the extent of testing. I think
2 nitrosamines and possible carcinogenic activity of a
3 variety of nitrosamines has been known for quite a
4 while.

5 Q. You don't have any basis on which to disagree
6 with Dr. Rodgman's statement that, quote, "Many
7 nitrosamines have been shown to be carcinogenic for
8 different organs in several species of animals";
9 correct?

10 MR. PLESEC: Objection.

11 A. I'm not an expert in the area. I don't have any
12 basis to disagree.

13 Q. He then states that "As nitrosamines are formed
14 by the reaction of oxides of nitrogen with secondary
15 amines, it is possible that cigarette smoke could
16 contain nitrosoanabasine and nitrosonornicotine";
17 correct?

18 MR. PLESEC: Objection.

19 A. That's what it says.

20 Q. It says "Nitrosoanabasine, which is a derivative
21 of the carcinogenic nitrosopiperidine, has now
22 produced many tumors of the esophagus when given
23 orally to rats"; correct?

24 MR. PLESEC: Objection.

25 A. That's what it says.

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1 Q. Do you know what the basis of that statement
2 was?

3 A. I sure don't.

4 Q. He then goes on to say "Nitroso" -- "Nitroso" --

5 A. "Piperidine."

6 Q. -- "piperidine caused death of animals with
7 malignant esophageal and liver tumors in 300 days";
8 correct?

9 MR. PLESEC: Objection.

10 A. That's what he says.

11 Q. He says "nitrosoanabasine induced tumors only
12 after 300 days"; correct?

13 MR. PLESEC: Objection.

14 A. That's what it says.

15 Q. At some point in time did Reynolds identify the
16 presence of nitros -- nitrosoanabasine as a
17 constituent of cigarette smoke?

18 A. Yes.

19 Q. When did they do that?

20 A. I can't tell you the first time that we've --
21 that we did it. For tobacco-specific nitrosamines
22 like nitrosoanabasine, we along with other people in
23 the scientific community have had difficulty getting
24 reproducible measures of these tobacco-specific
25 nitrosamines. We believe that we have reproducible

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1 measures, we have had for some time, but it was a
2 real scientific challenge to develop such methods
3 because these were very unstable, very difficult
4 molecules to quantitate.

5 Q. I take it that you're making a distinction
6 between identifying them in any form and being able
7 to identify the exact quantity in cigarette smoke;
8 correct?

9 MR. PLESEC: Objection.

10 A. I think it's -- it's one thing to detect the
11 presence of an unstable molecule in tobacco smoke. I
12 think it's another thing to develop a reproducible
13 measure that is -- that has reasonable -- reasonably
14 low variability within lab and has reasonable
15 accuracy across labs.

16 Q. When did R.J. Reynolds first identify the
17 presence of tobacco-specific nitrosamines?

18 A. I don't know. I would say probably in the late
19 '60s, early '70s. That's my best guess.

20 Q. Did R.J. Reynolds ever tell the public once they
21 identified these tobacco-specific nitrosamines that
22 some of these nitrosamines had been found to induce
23 tumors after 300 days in test animals?

24 MR. PLESEC: Objection.

25 A. I'm not aware of such case.

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1 Q. How many tobacco-specific nitrosamines has RJR
2 identified in cigarette smoke?

3 A. We identify -- we have identified and quantitate
4 four different specific tobacco-specific nitrosamines
5 in smoke.

6 Q. I just want to make sure I understand your
7 question.

8 MR. PLESEC: His answer.

9 Q. Your answer. First of all, you've only
10 identified in any quantity four tobacco-specific
11 nitrosamines; correct?

12 A. We have routine measure for four
13 tobacco-specific nitrosamines.

14 Q. Okay.

15 A. There are quite possibly others at much, much
16 lower levels, and like the case of benzopyrene, I
17 think those four serve as indicators of the whole
18 class of possible nitrosamines.

19 Q. So there are numerous other nitrosamines that
20 may be present in tobacco smoke that RJR does not
21 routinely measure; correct?

22 MR. PLESEC: Objection.

23 A. Well I think there certainly are nitrosamines
24 that we don't have a routine analytical test method
25 for. There are others that we have semi-routine

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1 methods for that are not tobacco-specific
2 nitrosamines, but they are in the class of
3 nitrosamines.

4 Q. Has R.J. Reynolds ever conducted biological
5 tests on the tobacco-specific nitrosamines to find --
6 to determine whether or not they are carcinogenic?

7 A. By "carcinogenic," I assume you mean a mouse
8 skin painting test or what?

9 Q. Any test.

10 A. We've done and are continuing to do biology on
11 nitrosamines, particularly trying to understand
12 genetic mechanisms and how nitrosamines may be
13 involved in genetic mechanisms of disease.

14 Q. What do you mean by that?

15 A. I'm not aware --

16 Q. Okay, I'm sorry, go ahead.

17 A. I'm not aware of the extent of biology that
18 we've done with nitrosamines. It's not my area. But
19 I do know that there's even a research group as we
20 speak looking at -- at nitrosamine/DNA interactions
21 that may be involved in certain diseases.

22 Q. Is the theory that nitrosamines alter the DNA of
23 normally healthy cells?

24 MR. PLESEC: Objection.

25 A. That's one theory that's on the table today.

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1 Q. What are the other theories that you're testing
2 at R.J. Reynolds?

3 A. Well I just gave you as an example of that. I
4 don't know the extent of all the biological work
5 that's going on on nitrosamines or has gone on. I
6 just happen to know that that work is going on right
7 now.

8 Q. Has your research confirmed that nitrosamines
9 from cigarette smoke do in fact alter the DNA of
10 normally healthy cells?

11 MR. PLESEC: Objection.

12 A. I think there's evidence -- and again this is
13 not my area, but I think there's evidence that
14 certain nitrosamines can form adducts with DNA. I
15 think the health implications of that adduct
16 formation are probably not known, but again we're way
17 outside my area.

18 Q. What's an adduct?

19 A. It's where one molecule reacts with another.

20 Q. To what end?

21 A. To form an adduct, to form a -- a molecule where
22 both pieces are now attached to each other.

23 Q. And what effect does that have when these pieces
24 are now attached to each other?

25 MR. PLESEC: Object to the form.

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1 A. What effect on what?

2 Q. On anything. What's the results of your -- what
3 are the results of your studies?

4 A. They're not my studies, and I don't know.

5 Q. So you know that nitrosamines have a negative
6 effect on cells and the DNA of cells, but you don't
7 know the significance of that?

8 A. What I said was we're doing research on genetic
9 mechanisms of disease. We know that nitrosamines
10 will interact and form adducts with DNA. I don't
11 know what the biological implications of that are.
12 You need to talk to one of our biologists.

13 Q. You would agree with me that as a general
14 proposition alterations of DNA in normally healthy
15 cells is not a good thing; correct?

16 MR. PLESEC: Objection, calls for an
17 opinion outside of his area.

18 A. I was just getting ready to say you're asking
19 for a layman's opinion.

20 Q. Well you're a scientist and a trained scientist,
21 sir.

22 A. But I'm not a biological scientist.

23 Q. You can read a scientific report just like I
24 can.

25 A. But I won't sit down and draw expert conclusions

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1 based on it if I don't understand the area fully.

2 Q. Well generally what you know, is it thought that
3 alterations to DNA in a normally healthy cell is a
4 good thing or a bad thing?

5 MR. PLESEC: Same objection.

6 A. My general opinion as one who does not work in
7 the field is that alterations to DNA is probably not
8 a good thing.

9 Q. Would you list for me the four nitrosamines that
10 RJR routinely measures.

11 A. NNN, NAB, NAT and NNK, and those are acronyms
12 for very long chemical names.

13 Q. Just for clarity sake, why don't we go ahead and
14 get the long chemical name. What's the long chemical
15 name for NNN?

16 A. Well it's actually referred to here. It's
17 nitrosonornicotine.

18 Q. And what's the long chemical name for NAB?

19 A. Nitrosoanabasine.

20 Q. What's the long chemical name for NAT?

21 A. Nitrosoanatabine.

22 Q. And what's the long name for NNK?

23 A. That's a real long one. It's
24 N-nitroso-3-pyridyl something 1-butanone. It's a
25 ketone formed by cleavage of nicotine with -- and

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1 then nitrosated.

2 Q. So NNK is a direct result of the inclusion of
3 nicotine in cigarettes?

4 A. All four of these are -- in some way have
5 nicotine as a precursor.

6 Q. So as long as there's nicotine in cigarettes and
7 as long as that nicotine is being volatilized, will
8 these nitro -- nitrosamines be present in smoke?

9 A. I don't understand your -- your phrase be
10 volatilized.

11 Q. Okay. Does the nicotine need to be volatilized
12 in order for these nitrosamines to form?

13 A. No.

14 Q. How do these nitrosamines form?

15 A. Our best understanding at this point is that
16 nitrosamines are formed during the curing process and
17 that the tobacco-specific nitrosamines are formed as
18 a result of microbial action on nicotine together
19 with nitrate or nitric acid present that results from
20 the nitrate. That is definitely a biological action
21 during curing process.

22 Q. Okay. And when a cigarette is smoked, are the
23 nitrosamines released into the cigarette smoke?

24 A. We believe that the nitro -- these four
25 nitrosamines wind up in cigarette smoke primarily as

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1 a matter of direct transfer from the tobacco, that --
2 and those -- and those four nitrosamines are formed
3 during curing. They're directly transferred during
4 the heating process as opposed to being formed via
5 pyrolysis mechanism.

6 Q. Okay. So heating alone is enough to release
7 these nitrosamines, correct, the tobacco-specific
8 nitrosamines?

9 MR. PLESEC: Objection.

10 A. To distill them or heat, to remove them from the
11 tobacco and transfer them to smoke.

12 Q. Can you give me the various levels of the four
13 tobacco-specific nitrosamines as they're measured?

14 MR. PLESEC: Objection.

15 A. Well I -- I can give you ballpark figures.

16 Q. Do --

17 The nitrosamines, are they also a function of
18 the tar level?

19 A. Very much so.

20 Q. Okay. And so I assume that any number you give
21 me is going to be dependent on what number you're
22 using for tar; right?

23 A. That's correct. They pretty much go along with
24 tar. They track tar in the same way.

25 Q. I believe you stated that the average tar level

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1 in today's cigarettes is 12 or 13?

2 A. 12.

3 Q. Okay. Using 12 as the average tar figure, what
4 would be the level of nitrosamines?

5 A. NNK would probably be -- probably be on the
6 order of 350 nanograms per cigarette.

7 Q. Okay.

8 A. NNK would be about a third to a fifth that. NAB
9 and NAT would probably be slightly less than that.

10 Q. Okay. I'm sorry, I think I missed your first
11 one. The first one was --

12 A. NNK.

13 Q. NNK is 350?

14 A. Maybe 350.

15 Q. Okay. Then NAT is --

16 A. No, NNN would be maybe a third that level or
17 less.

18 Q. So 115?

19 A. Yeah, or a hundred or slightly less than a
20 hundred perhaps.

21 Q. Okay.

22 A. NAB and NAT would be less than that, maybe a
23 half to three-fourths of that.

24 Q. So somewhere between 50 and --

25 A. Just ballpark figures.

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1 Q. -- 75?

2 A. Yeah, I think that's right. They're all in the
3 nanogram range. I believe NNK is the highest
4 concentration.

5 Q. And again all of these substances are going to
6 be present as long as nicotine is present; correct?

7 A. No, as long as you're heating cured tobacco that
8 contains nicotine.

9 Q. In order to remove those nitrosamines, would you
10 actually have to remove the nicotine prior to
11 curing? I'm just trying to understand.

12 A. Yeah, I know. It's an interesting question
13 because it's one that we've -- we've worked on very
14 hard, and I think there's two ways that one can
15 reduce nitrosamine levels in cigarettes. We're
16 pursuing both. The first is altering the curing
17 process to prevent the formation of nitrosamines. I
18 believe there's ways to do that, particularly by
19 reducing the humidity during curing to prevent the
20 biological action, get the humidity so low that --
21 that the bacteria don't convert nicotine into
22 nitrosamines.

23 The second pathway of trying to reduce nicotines
24 is to somehow kill the bacteria. One concept, for
25 example, is that a farmer may use a fogger in -- in

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1 the curing where very low concentrations of some
2 vapor-phase compound like 2-hexenal could in fact
3 kill the bacteria and thus prevent the formation of
4 nitrosamines. Both are equally viable approaches.

5 Q. Has RJR been able to commercialize a cigarette
6 which has reduced levels of tobacco-specific
7 nitrosamines?

8 A. Yes.

9 Q. What's the name of that cigarette?

10 A. EW.

11 Q. So EW is the result of your work to actually
12 reduce nitrosamines; correct?

13 A. No. EW is a result of a proprietary blend that
14 starts out with low nitrogen and low -- low
15 nitrosamine levels in the first place through a very
16 carefully selected blend.

17 Q. So none of those blends or tobaccos have been
18 exposed to any of your nitrosamine-eliminating
19 technology; correct?

20 MR. PLESEC: Objection.

21 A. That proprietary low-nitrogen blend is a result
22 of special selection of tobaccos to yield a
23 low-nitrogen final finished blend. It does not
24 incorporate the attempt to kill the bacteria in a
25 curing barn, as I just outlined. It -- it can

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1 perhaps result as -- as -- or it can -- the reduction
2 can result from reduced humidity during curing,
3 however.

4 But at any -- in any event, there are special
5 selected tobaccos to yield this proprietary blend.

6 Q. Other than EW, has Reynolds commercialized any
7 product that has selectively removed nitrosamines?

8 A. Tobacco-specific nitrosamines?

9 Q. We'll start with that first.

10 A. EW I believe is the first success at reducing
11 tobacco-specific nitrosamines.

12 Q. Okay. Is there any Reynolds commercial product
13 that has attempted to reduce -- specifically reduce
14 nitrosamines generally?

15 A. Similar to the discussion we had on phenol, we
16 found that many of the volatile nitrosamines are
17 selectively removed by cellulose acetate filters and,
18 in particular, triacetin-plasticized cellulose
19 acetate filters, very high selective removal
20 efficiency. So volatile nitrosamines like
21 N-dimethylamine -- or N-nitrosodimethylamine are very
22 efficiently scrubbed by triacetin-plasticized
23 filters.

24 Q. And again to come back to your previous
25 testimony, as best you know, there's been no testing

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1 done to determine whether the smoke from those
2 cigarettes is actually safer; correct?

3 MR. PLESEC: Objection.

4 A. I don't know how one proves whether one product
5 is safer than another.

6 Q. And so if you don't know how to prove that, it's
7 safe to say that none of that testing exists in RJR;
8 correct?

9 MR. PLESEC: Objection.

10 A. I don't know whether that's -- I don't think
11 that's safe to say at all. I think I don't know the
12 extent of the biology or toxicology work that's been
13 done at Reynolds. I know some of it.

14 Q. And what you do know does not give you an answer
15 to my questions; correct?

16 MR. PLESEC: Objection, form.

17 A. I'm not aware of biological testing inside
18 Reynolds to evaluate reduce -- the -- the biol -- the
19 biological implications of reduced nitrosamine
20 levels. In the EW product we did test, as we talked
21 about this morning, those products with a number of
22 bioassays. Some had reductions; some didn't.

23 Q. And just so we can bring this particular topic
24 to an end, R.J. Reynolds has never commercialized the
25 EW product in the state of Minnesota; correct?

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1 A. EW's never been for sale in Minnesota.

2 Q. Okay.

3 MR. O'FALLON: Want to take a quick break?

4 MR. PLESEC: Sure.

5 THE REPORTER: Off the record, please.

6 (Recess taken.)

7 BY MR. O'FALLON:

8 Q. Dr. Townsend, I'd like to show you a document
9 that's been previously marked as Plaintiffs'
10 Exhibit 1150*, and I believe that's going to be
11 changed to 1150-A. This is a document that's Bates
12 stamp numbered 51246 4017 through 4018.

13 Have you seen this document previously?

14 A. I don't recall seeing this document.

15 Q. It states at the top that it's a "TABLE 7. -
16 Tumorigenic agents in tobacco and tobacco smoke";
17 correct?

18 A. That's what it says.

19 Q. Does this look like an R.J. Reynolds document?

20 MR. PLESEC: Objection.

21 A. I have no idea.

22 Q. I'm asking that question because this has been
23 produced by R.J. Reynolds, but there's very little
24 else I can find out about the document, and I'm
25 basically trying to ask whether you recognize this

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1 document or any report that would have contained as a
2 Table 7 a document like this.

3 A. I --

4 MR. PLESEC: Objection. I believe he said
5 he had never seen this document before.

6 A. Yeah, I've never seen this document before and I
7 don't know whether this was a Reynolds document or
8 not. This is similar type of information that I
9 think is in the IARC report.

10 Q. What is the IARC report?

11 A. IARC, which is a group under the Royal Health
12 Organization, is the International Agency for
13 Research on Cancer. They publish -- they've
14 published quite a lot of information about
15 constituents of tobacco smoke and those constituents
16 in tobacco smoke that are thought to be either animal
17 carcinogens or have probable cause for thinking
18 they're human carcinogens.

19 This is a similar type of information that I've
20 seen in IARC reports, so I have not -- but again I
21 have no idea about the exact source of this
22 particular document as it refers to Table 7.

23 Q. Sir, would this be a complete list of the
24 tumorigenic agents in tobacco and tobacco smoke based
25 on your knowledge at R.J. Reynolds?

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1 MR. PLESEC: Objection.

2 A. I really don't know.

3 Q. Could you just take a look at it and see if
4 there are any substances that are obviously missing
5 from this list.

6 MR. PLESEC: Objection. It's calling for a
7 conclusion that's outside the scope of his
8 expertise.

9 A. By "tumorigenic," you mean what, "tumorigenic
10 agent"?

11 Q. I believe usually "tumorigenic agent" is defined
12 to be an agent that produces tumors.

13 A. In what kind of test, mouse skin painting?

14 Q. Is that your understanding?

15 A. Well I just wanted to make sure I understand
16 what this is. See, I'm not sure --

17 Q. Well this isn't a document out of my files,
18 sir. This is a document out of your files.

19 MR. PLESEC: Objection.

20 Q. Well it is. I mean, I can show you where it was
21 produced and I can show you the information we
22 were -- that was produced with it. I'm not making
23 this up.

24 MR. PLESEC: No, I don't think he's trying
25 to argue with you.

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1 THE WITNESS: No, I'm not.

2 MR. PLESEC: I think he's just trying to
3 figure out what the question is and -- and how you're
4 using the term "tumorigenic," in what context.

5 MR. O'FALLON: I'm using it in the context
6 of this document. If he doesn't have an
7 understanding of how it's used in the context of this
8 document, then he can give me his best understanding
9 of how he would use it.

10 (Witness reviews Plaintiffs'

11 Exhibit 1150*.)

12 A. Okay. I'm sorry. What's your question? I've
13 reviewed the document now.

14 Q. Does this appear to be a complete listing of the
15 number of the tumorigenic agents that RJR knows to be
16 in tobacco smoke?

17 MR. PLESEC: Objection.

18 A. I believe this is a listing -- I'm not certain
19 that it's a complete listing, but I think it's a
20 listing of constituents that are in tobacco smoke
21 that are thought by IARC -- IARC to be either animal
22 carcinogens or in some cases have sufficient evidence
23 to conclude that they may be a human carcinogen.

24 Q. Okay. And there are a few of the substances in
25 tobacco smoke that IARC does believe have sufficient

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1 evidence to be classified as carcinogens in humans;
2 correct?

3 MR. PLESEC: Objection.

4 A. There are several constituents that are present
5 in smoke at low levels that are classified as
6 probable human carcinogens by IARC.

7 Q. Okay. Two of those would be under the "Aromatic
8 Amines" on the first page of the document; correct?

9 A. There are two under that category on this list.

10 Q. That are listed as "Sufficient" under "Evidence
11 for IARC evaluation of carcinogenicity in humans";
12 correct?

13 A. That's what this document says.

14 Q. Okay. Do you know at what levels those
15 substances are carcinogenic in humans?

16 A. If either of those constituents are carcinogenic
17 in humans, I have no idea at what level, what overall
18 exposure or what circumstances that might be the
19 case.

20 Q. R.J. Reynolds has never tested those two
21 particular substances to determine at what level they
22 become carcinogenic?

23 MR. PLESEC: Objection, assumes facts not
24 in evidence.

25 A. We were talking about human carcinogenicity.

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1 Now you're jumping to animal carcinogenicity?

2 Q. Are you distinguishing between the two?

3 A. Well there is a distinction.

4 Q. Well are you saying that those two carcinogens
5 were tested in humans?

6 MR. PLESEC: Objection.

7 A. No, I didn't say that.

8 Q. They would have been tested in animals, and the
9 animal testing would have been deemed sufficient to
10 call them carcinogenic in humans; correct?

11 MR. PLESEC: Objection.

12 A. Well I think there's more to the analysis to get
13 IARC to decide that something has sufficient proof to
14 be a prob -- or sufficient information to be a
15 probable human carcinogen. I think it's more than
16 just animal testing.

17 Q. What else --

18 A. That's my -- that's my superficial
19 understanding.

20 Back to your original question, has Reynolds
21 done carcinogenicity testing on those two aromatic
22 amines, I don't know whether we've done any
23 laboratory studies on those two aromatic amines. We
24 have measured and quantitated levels in cigarettes
25 and we've sought ways to reduce both of them in

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1 smoke.

2 Q. Of those two aromatic amines?

3 A. Those two specific aromatic amines,
4 beta-naphthylamine and 4-aminobiphenyl, has been the
5 subject of an extensive amount of work at Reynolds.

6 Q. Including selective removal?

7 A. Trying to define analytical methodology that
8 will give us reproducible and accurate quantitation
9 of those two at the extremely low levels present in
10 cigarettes, and also we've tried methods for
11 selective removal of those two.

12 Q. Have you been successful in measuring either of
13 those two aromatic amines?

14 A. We have a routine test method, analytical test
15 method, that is reproducible and we believe at this
16 point reasonably accurate for measuring both
17 beta-naphthylamine and 4-aminobiphenyl.

18 Q. And what level did they occur in tobacco smoke
19 assuming a tar level of 12?

20 A. Beta-naphthylamine is on the order of -- I'm --
21 just right off the top of my head, is on the order
22 of, I would say, 4 to 6 nanograms per cigarette. And
23 4-aminobiphenyl is on the order of 1 to 2 nanograms
24 per cigarette, as I recall. Those are ballpark
25 figures.

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1 Q. And again those are assuming 12 milligrams of
2 tar; correct?

3 A. That's correct.

4 Q. Have you been successful in selectively removing
5 those two aromatic amines?

6 A. Not yet. We're still working on it.

7 Q. Let's move down to the aldehydes. Have you
8 developed methods of selectively measuring
9 formaldehyde?

10 MR. PLESEC: Objection.

11 A. I don't understand what you mean "selectively
12 measuring."

13 Q. Bad choice of words. Have you developed a
14 method of measuring the amount of formaldehyde in
15 cigarette smoke?

16 A. We have a routine analytical method for
17 measuring formaldehyde in smoke.

18 Q. And assuming 12 milligrams of tar, what is the
19 level of formaldehyde in smoke?

20 A. I'll have to go back and look at exact data, but
21 as -- I'll give you a ballpark figure. I think it's
22 in the neighborhood of about 30 to 40 micrograms per
23 cigarette.

24 These are ballpark figures. We can certainly
25 provide accurate numbers.

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1 Q. How about acetaldehyde? What's the ballpark
2 figure there?

3 A. 3 to 400 micrograms per cigarette.

4 Q. Let's move down to the --

5 How about benzene? Do you have a routine method
6 for measuring that?

7 A. We do have a method for measuring benzene.

8 Q. And what's the average benzene content given a
9 12-milligram-tar cigarette?

10 A. I would say in the neighborhood of 40 to 60
11 nanograms per cig -- or micrograms per cigarette.

12 Again these are ballpark figures. We can get
13 very accurate data if you -- if you like.

14 Q. How about acrylonol -- I can't even pronounce
15 that. How do you pronounce that next chemical?

16 A. Acrylonitrile.

17 Q. Do you measure that?

18 A. We don't have a routine method for
19 acrylonitrile.

20 Q. How about the next substance?

21 A. We don't have a method for that either.

22 Q. Could you pronounce that for me.

23 A. Dimethylhydrazine.

24 Q. Okay. How about 2-nitropropane?

25 A. No.

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1 Q. How about ethylcarbamate?

2 A. No.

3 Q. How about vinyl chloride?

4 A. We do have a routine analytical method for vinyl
5 chloride.

6 Q. And what is the routine level of vinyl chloride
7 in a 12-milligram cigarette?

8 A. Somewhere between 3 and 10 nanograms per
9 cigarette approximately.

10 Q. Let's go down to the inorganic compounds.

11 Hydrazine, do you have a routine measure for that?

12 A. No.

13 Q. Arsenic?

14 A. We do for arsenic.

15 Q. And what is the routine amount in a
16 12-milligram-tar cigarette?

17 A. Again you're forcing me to guess without
18 referring to data, so that's all I'm doing, is giving
19 you my best guess. Arsenic I would say would be on
20 the order of 10 to 30 or 40 nanograms per cigarette.

21 Q. Do you routinely measure nickel?

22 A. We have an analytical method for it.

23 Q. And what's your routine measure for a
24 12-milligram cigarette?

25 A. For a 12-milligram cigarette, we don't see

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1 detectable levels of nickel.

2 Q. Chromium?

3 A. We have a method for chromium.

4 Q. And what's your measure for chromium?

5 A. For tobacco -- for a 12-milligram cigarette, we
6 don't see detectable levels of chromium.

7 Q. Cadmium?

8 A. Cadmium we have a routine method for.

9 Q. And what's your standard level for a
10 12-milligram cigarette?

11 A. For a typical 12-milligram cigarette, I would
12 estimate cadmium levels to be in the 80 to 100
13 nanograms per cigarette.

14 Q. Do you measure lead?

15 A. Not routinely. We have a method for it, but
16 not -- we don't routinely measure it. Generally
17 levels are extremely low.

18 Q. How about polonium-210?

19 A. We don't have a routine method for polonium.

20 Q. The next set of documents are PAH.

21 A. That's correct.

22 Q. Is that polycyclic aromatic hydrocarbons?

23 MR. PLESEC: Next set of documents or --

24 MR. O'FALLON: Excuse me?

25 MR. PLESEC: I think you misspoke. Did you

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1 say "the next set of documents"?

2 MR. O'FALLON: Oh, I meant the next set of
3 designations.

4 Q. The next set of designations, it's under "PAH";
5 right?

6 A. The next section is titled "PAH."

7 Q. And that means?

8 A. Polycyclic aromatic hydrocarbons.

9 Q. Okay. Do you routinely measure all of these?

10 A. No, we don't.

11 Q. Which ones do you routinely measure?

12 A. We have a routine analytical method for
13 benzopyrene. We consider benzopyrene, which is
14 present in higher levels than the others in typical
15 cigarettes, we consider our analysis for benzopyrene
16 a marker for the others. We do have nonroutine
17 methods to look at many of these others if we need to
18 go in and look at a complete breakdown of the
19 polycyclic aromatic hydrocarbons.

20 Q. What's your routine measure for benzopyrene in a
21 12-milligram cigarette?

22 A. A 12-milligram cigarette is roughly -- it's in
23 the neighborhood of 5 nanograms per cigarette.

24 Q. Why is it that your methods are so much
25 different, your numbers are so much different than

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1 what's measured here in mainstream smoke?

2 MR. PLESEC: Objection.

3 A. I see -- I've seen data like this in many -- in
4 many other references, and it may in fact be the same
5 data passed from one reference to another. I can
6 tell you that in many references that are trying to
7 sum up the mainstream smoke levels for various
8 constituents, because cigarettes are -- are extremely
9 different and because some of the older publications
10 had had measurements that were very high, today's
11 cigarettes are somewhat lower, you'll notice that
12 some of the measurements I gave you were higher than
13 the ones or on the high side of the ones reported
14 here.

15 I think there's just a lot of difference in
16 different cigarettes over time, also in different
17 cigarettes within the market, and particularly in
18 some analyses there are differences in the analytical
19 methodology from lab to lab, which is one reason that
20 analytical chemists have to worry very much about
21 having not only a precise method that can give
22 reproducible results in their lab, but also an
23 accurate method that gives the same results from lab
24 to lab. I think this points that out.

25 Q. When you do your testing, are you using standard

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1 FTC testing?

2 A. Typically we use FTC smoking parameters in
3 generating the smoke. Now, with that said, we've
4 done a number of experiments measuring many of these
5 analytes at alternate puffing conditions.

6 Q. The numbers you've been giving me, are those the
7 FTC parameters?

8 A. That's correct.

9 Q. Are there any other of the polycyclic
10 hydrocarbons that you measure on a regular basis
11 other than benzopyrene?

12 A. Benzopyrene is the only compound that we have a
13 routine measure for. As I said, we can go in and
14 measure levels of many of these and I think even a --
15 maybe even a few others that we can measure on a
16 semi-routine level if we -- you know, if that's
17 important to do for the experiment.

18 Q. Let's look on the next page. Are you familiar
19 with the aza-arenes?

20 A. Yes.

21 Q. And what are those?

22 A. Those are polycyclic hydrocarbons that have
23 nitrogen molecules somewhere in that ring.

24 Q. Are those also developed during the curing
25 process?

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1 A. I don't believe so. I think those are generated
2 during the burning of tobacco.

3 Q. Do you routinely measure any of those
4 substances?

5 A. We have a method for quinoline. We have
6 measured levels of dibenzacridine and dibenz -- well
7 the two isomers of dibenzacridine. We've looked at
8 carbazoles as well, in fact a series of carbazoles.

9 We identified many of the aza-arenes and
10 presented them in the peer reviewed literature. We
11 don't have routine test methods that -- that we use,
12 but we do have analytical methods for answering
13 specific questions where we can go in and quantitate
14 and look for differences in levels in many of these
15 things.

16 Q. Have you ever tried to selectively remove those
17 substances?

18 A. Aza-arenes? We've given a lot of thought to it
19 and tried to figure out how we can go about it, and
20 frankly I haven't a clue how we can do that at this
21 point other than go into low-nitrogen tobacco blends
22 like we tried to do in EW. Surprisingly, we really
23 thought that EW because of the low nitrogen content
24 of that blend, that special blend, that we would in
25 fact reduce aza-arenes. We also thought we would

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1 reduce aromatic amines, and we didn't touch either of
2 those, which threw us back to the drawing board
3 trying to try to understand how those compounds are
4 formed in smoke, what the precursors are and just
5 what the hell we can do about it.

6 Q. Did your EW cigarette actually increase the
7 amount of the polycyclic hydrocarbons and the
8 aza-arenes?

9 A. No.

10 Q. Did it --

11 A. No.

12 Q. -- reduce them?

13 A. No, they were the same, statistically the same
14 level as the control product. But frankly we were
15 surprised because we expected the low-nitrogen blend
16 to affect both the aza-arenes and the aromatic amines
17 for beta-naphthylamine and 4-aminobiphenyl. Didn't
18 touch either one of those as far as we can tell.

19 Q. The next substances are the N-nitrosamines. Are
20 there any of those that you -- well we've already
21 gone over the routine measures of those; correct?
22 You measure four?

23 A. We measure four tobacco-specific nitrosamines.
24 We have the capability of measuring others on a
25 semi-routine basis.

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1 Q. Okay. And how about the IARC compounds not
2 included above, berythium -- beryllium? Beryllium.

3 A. Beryllium.

4 Q. Do you routinely measure that?

5 A. No. I'm not aware of any routine methods that
6 we use for this entire column.

7 Q. Okay. And what are the Hoffmann compounds not
8 included above; do you know?

9 A. Well NAT is a tobacco-specific nitrosamine.
10 1-naphthylamine, that's an aromatic amine, just a
11 different isomer from beta-naphthylamine, which we've
12 already talked about; this is alpha-naphthylamine.
13 NNAL is a nitros -- is a nitrosamine. Iso-NNAL is
14 another nitrosamine. NNAL I believe is present in
15 very low levels. I think 1 -- or the 1-naphthylamine
16 is present in extremely low levels.

17 And I don't know why they're separated other
18 than they're termed "Hoffmann Compounds," compounds
19 that Dr. Hoffmann I think has considered in various
20 publications. My guess is that they're separate
21 because they haven't been picked up as IARC -- by
22 IARC and considered as carcinogens. I don't know.
23 That's my guess.

24 Q. If my count is correct, there's approximately
25 50-some identifiable tumorigenic agents listed on

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1 this particular exhibit, Plaintiffs' Exhibit 1150-A.

2 Would that correspond with your count?

3 A. I haven't counted them. Would you like me to?

4 Q. Just take a quick count through, if you would.

5 A. Well I counted 52, but one of us may have missed
6 one or added one.

7 Q. So we've progressed from 1950 where we had 1
8 substance, benzopyrene, that was thought to be
9 carcinogenic to 40 years later, in 1994, having over
10 50 substances that are thought to be carcinogenic;
11 that is, substances contained in tobacco smoke;
12 correct?

13 MR. PLESEC: Objection.

14 A. Well first of all, I think this table lists
15 several that where there's no information on whether
16 they -- IARC has considered it as lab -- as an animal
17 carcinogen or as a human carcinogen; for example,
18 crotonaldehyde, so it was suspected to be -- my
19 interpretation not being an expert in the area, is
20 that crotonaldehyde was suspected to be carcinogenic,
21 and from this table there's no evidence at this point
22 that it is in either animals or humans.

23 So there's several cases like that. There are
24 many cases where it's claimed there's sufficient
25 evidence that these constituents -- that many of

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1 these constituents are carcinogenic in lab animals,
2 but not sufficient information for that determination
3 in humans. And then there's a few where they claim
4 sufficient information to deem that constituent a
5 human car -- a probable human carcinogen.

6 Q. Well if I count right, there's at least 40
7 substances on here that are deemed to have sufficient
8 evidence of carcinogenicity in lab animals.

9 A. Okay.

10 Q. Would that correspond with your understanding?

11 A. Well I haven't counted them, but I'll take your
12 word for it.

13 Q. Okay. And would that also correspond with your
14 general understanding, that there are approximately
15 40-some compounds that have now been identified in
16 cigarette smoke that are thought to be carcinogenic
17 at least to animals?

18 MR. PLESEC: Objection.

19 A. I know that the IARC list, as I've seen it,
20 includes either 43 or a few more potential
21 carcinogens.

22 Q. And it's my understanding that R.J. Reynolds has
23 not been able to selectively remove completely any of
24 these substances from a commercial cigarette.

25 Correct?

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1 MR. PLESEC: Objection.

2 A. That's not true at all.

3 Q. I thought the EW cigarette only reduced the
4 levels.

5 A. Oh, I'm sorry. You did say "remove," didn't
6 you?

7 Q. I said "remove completely," so let me go back
8 and ask it.

9 A. Sorry.

10 Q. And it's my understanding that R.J. Reynolds has
11 not been able to specifically remove completely any
12 of these substances from a commercial cigarette.

13 Correct?

14 MR. PLESEC: Objection.

15 A. We have made in some cases significant
16 reductions of some of these in selective removal,
17 some reductions, not elimination. In two cases, two
18 commercial products that were in test market, Premier
19 and Eclipse, many of these constituents fell -- fell
20 below detectable threshold levels.

21 Q. Neither Premier nor Eclipse have ever been
22 commercially sold in Minnesota; correct?

23 A. They -- Premier has been in test market in three
24 locations. Eclipse is currently in test market in
25 three locations. Premier failed in the market, as

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1 you know. Eclipse I hope does better, but it
2 presently is not in market in Minnesota.

3 Q. Okay. So again the answer to my question is
4 that neither Premier nor Eclipse have been
5 commercially sold in Minnesota; correct?

6 A. That's a correct statement.

7 Q. I'd like to move on to the whole notion of
8 general reduction, which was basically the second
9 theme in the testimony you gave in the case down in
10 Florida, the Connor case; correct?

11 A. Right.

12 Q. We started to talk about this subject matter
13 earlier, but I do want to come back to it.

14 Is it your understanding that smokers basically
15 smoke to receive a given dose or amount of nicotine?

16 MR. PLESEC: Objection.

17 A. Well I'm not an expert in why people smoke, of
18 course, but I'll tell you I think nicotine is very
19 important to the overall smoking process, the overall
20 smoking enjoyment. I don't believe that it's the
21 only reason people smoke and I don't believe -- I'm
22 sorry, back up. Can -- can you ask me the question.
23 I'll try to give you a simple answer.

24 Q. Yeah, I think -- I think you and I are -- are --
25 are going on a -- on a different --

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1 A. Sure.

2 Q. We're interpreting my question differently.

3 (Discussion off the stenographic record.)

4 Q. Would you agree that smokers routinely smoke to
5 a given level of nicotine; that is, that each smoker
6 seems to have a level of nicotine that they attempt
7 to hit each time they smoke; that is, level of
8 nicotine in their bloodstream?

9 MR. PLESEC: Objection, assumes facts not
10 in evidence.

11 A. Well I'm not an expert in the area. I've never
12 seen any information that suggests that there is a
13 target level that a smoker will smoke to get nicotine
14 in their blood.

15 Q. Okay. And just so we're clear about this, I'm
16 not saying that every smoker smokes to a target
17 level, but that every smoker has their own individual
18 target level and that based on their behavior they
19 appear to constantly be trying to reach that target
20 level of their own.

21 Do you understand what I'm saying?

22 A. I think I understand what you've said, and I
23 don't think I agree with that based on my personal
24 experience because I know that there are times,
25 particularly days where I smoke very little. There

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1 are particularly days that I smoke more than that. I
2 am a smoker. My own personal experience would argue
3 that there's not a given level that I strive to
4 achieve on an ongoing basis.

5 Q. Okay. Let me ask it a little bit different
6 way.

7 Would you agree that each smoker when they smoke
8 one cigarette attempts to obtain from that cigarette
9 a given amount of nicotine?

10 MR. PLESEC: Objection, lack of foundation,
11 lack of facts in evidence, outside the scope of this
12 witness's expertise.

13 MR. O'FALLON: No, this is -- this is spot
14 on for this witness's expertise.

15 A. I don't -- I don't think there's any evidence
16 that that's the case at all, that a -- that a
17 smoker -- if I understand your question right, that a
18 smoker will smoke a particular cigarette to get a
19 certain nicotine yield from it, from that one
20 cigarette.

21 Q. You understand the whole notion of nicotine
22 compensation; correct?

23 A. I'm familiar with the term "compensation." I'm
24 familiar with many of the arguments.

25 Q. Nicotine compensation indicates that smokers

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1 have a certain nicotine level that they smoke for,
2 that they smoke their cigarettes to reach a certain
3 blood level of nicotine in their bloodstream. You
4 understand that?

5 A. I understand that concept.

6 Q. Okay. It's your understanding that the
7 tar-to-nicotine ratio is basically the same across
8 cigarettes; correct?

9 MR. PLESEC: Objection.

10 A. That's not what we said earlier this morning.

11 Q. Okay. And that's not what you've testified to
12 previously?

13 A. Beg your pardon?

14 Q. Haven't you testified to that previously?

15 A. That tar-to-nicotine ratios are the same? I
16 said --

17 Q. Right.

18 A. -- this morning that tar/nicotine ratio can span
19 a range from -- and I gave you I think numbers on the
20 range of -- in -- in the order of 13 tar-to-nicotine
21 ratio down to maybe 10 or even maybe even 9 based on
22 how that cigarette is built.

23 Q. Does nicotine fluctuate independent of tar in
24 cigarettes?

25 MR. PLESEC: Objection.

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1 A. General -- nicotine pretty well tracks tar, not
2 exactly because the -- the construction
3 characteristics of a cigarette will, to a small
4 degree, change the ratio.

5 Q. Do you recall having your deposition taken in
6 the State of Florida case?

7 A. I remember that deposition.

8 Q. It was taken on May 29th of 1997; is that
9 correct?

10 A. I don't recall the exact date. Take your word
11 for it.

12 Q. Do you recall being asked the following question
13 and giving the following answer: "Question" --

14 MR. SIMONSON: What page is that on?

15 MR. PLESEC: Counsel, do you have an extra
16 copy of that?

17 MR. O'FALLON: No, I do not.

18 MR. PLESEC: Okay. What page and line are
19 you on?

20 MR. O'FALLON: I'm on 183.

21 MR. PLESEC: Page one eighty --

22 MR. O'FALLON: I'll show it to him. Let me
23 ask a question; then I'll show it to him.

24 MR. SIMONSON: For the -- for the record, I
25 would like to have a page and line as part of your

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1 question, if we could.

2 MR. O'FALLON: I said I'd give it after I
3 asked the question.

4 MR. SIMONSON: I heard you say you'd show
5 it to the witness, but I just for my own notes
6 wondered if you'd -- you'd state it on the record so
7 I could make note of it.

8 MR. O'FALLON: I will when I get to that
9 point.

10 BY MR. O'FALLON:

11 Q. Do you recall having the following question
12 asked and giving the following answer: "Question:
13 Does nicotine fluctuate independently of tar in
14 cigarettes?

15 "Answer: No"?

16 Do you recall that?

17 A. I don't remember that specific question. I
18 don't doubt it because I've been asked that question
19 on more than one occasion.

20 Q. I'm asking you to look at page 183 of a
21 deposition you gave on May 29th, 1997 --

22 A. I'm looking at it.

23 Q. -- in the State of Florida case.

24 A. I'm looking at it.

25 Q. And you were asked the question -- why don't you

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1 read the question you were asked.

2 A. On line 14 the question reads "Does nicotine
3 fluctuate independently of tar in cigarettes?" Line
4 16, "Answer: No."

5 Q. Okay. You understood when you gave that answer
6 the importance of giving an accurate answer;
7 correct?

8 A. Of course.

9 Q. Okay. Now when someone asks you whether
10 nicotine fluctuates independent of tar, you would
11 understand that they're talking about the
12 tar-to-nicotine ratio; correct?

13 A. That would be my interpretation.

14 Q. Okay. And so your interpretation --

15 MR. O'FALLON: Excuse me, do you got a
16 comment?

17 MR. SIMONSON: I had a comment to my
18 colleague.

19 MR. O'FALLON: Okay.

20 Q. And you understand when someone asks you whether
21 nicotine fluctuates independent of tar they're in
22 essence asking you whether or not the nicotine-to-tar
23 ratio remains constant; correct?

24 MR. PLESEC: Objection.

25 A. Well I think that's interpretation. We've

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1 looked at -- if -- if you remember back in 1994, the
2 FDA, for example, alleged that --

3 Q. Can I have that back, by the way.

4 A. -- that the tobacco industry -- members of the
5 tobacco industry and Reynolds had manipulated
6 nicotine, added nicotine, and the ratio had changed
7 dramatically. We went back and calculated accurate
8 sales-weighted -- and updated our sales-weighted tar
9 and nicotine yield data. I used that as an exhibit
10 in trial testimony, which clearly shows that both the
11 tar and nicotine levels come down more or less
12 proportionately.

13 The -- the curves are -- are parallel almost,
14 and the reason they're not exactly parallel is not
15 nicotine manipulation; it is because the particular
16 design variables, especially air dilution and
17 filtration, remove tar slightly more efficiently than
18 they remove nicotine.

19 Q. But that's not the answer you gave when the
20 attorney asked you that question in May 29th of 1997
21 of this year. You stated point blank nicotine
22 doesn't fluctuate independently of tar in cigarettes,
23 so you were wrong; correct?

24 A. No, --

25 MR. PLESEC: Objection.

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1 A. -- I am not wrong. That is my interpretation of
2 that question, and I stand by that interpretation of
3 that question. That question to me says that the tar
4 and nicotine don't fluctuate independently.

5 Q. Well --

6 A. My answer remains they don't fluctuate
7 independently. The ratio will change slightly
8 depending on how you build a cigarette, but back to
9 the allegations that I think drive -- and this is my
10 interpretation -- that drive that question, I stand
11 by that answer. That answer's correct.

12 Q. Those allegations aren't contained there, are
13 they?

14 A. You've got to put --

15 MR. PLESEC: Objection.

16 A. You've got to put -- I have to put questions
17 like that into context. I'm sorry.

18 Q. Well is that what you're doing with my questions
19 here today or are you just trying to answer my
20 questions as I state them to you?

21 A. I'm trying to answer your questions honestly and
22 accurately, --

23 Q. Were you --

24 A. -- no question about it. But I'll tell you in
25 the back of my head there's always interpretation,

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1 and that's part of why I've misinterpreted you on
2 several questions.

3 Q. Do you think he could have stated this question
4 any more clearly than, quote, "Does nicotine
5 fluctuate independently of tar in cigarettes?"

6 MR. PLESEC: Objection.

7 A. I stand by that answer. Nicotine does not
8 fluctuate independently of tar. Nicotine-to-tar
9 ratio does depend to a degree on the cigarette
10 construction.

11 Q. Okay. Now if the nicotine-to-tar ratio remains
12 relatively consistent and has remained relatively
13 consistent over time, then the amount of tar that one
14 receives is going to be dependent on the amount of
15 nicotine one takes in; correct?

16 MR. PLESEC: Objection.

17 A. The amount of tar and nicotine that a smoker
18 takes into their mouth will depend on how they
19 smoke.

20 Q. And the amount of nicotine they take in;
21 correct?

22 MR. PLESEC: Objection.

23 A. The amount of tar and nicotine that they take
24 into their mouth will depend on the product they
25 choose and how they smoke it.

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1 Q. Right. And smokers smoke different products
2 differently; correct?

3 A. Smokers probably smoke different products
4 differently. Smokers probably smoke the same product
5 differently from one cigarette to the next --

6 Q. And --

7 A. -- and even from puff to puff.

8 Q. And you have evidence to back up that last
9 statement?

10 A. Absolutely.

11 Q. Scientific evidence?

12 A. Absolutely.

13 Q. What studies, sir?

14 A. The first large study that I'm aware of was one
15 that -- conducted in Atlanta, Georgia, a very large
16 smoker -- human smoker behavior study where we
17 measured puffing dynamics for consumers.

18 Q. In what year?

19 A. 1982, '83, thereabouts.

20 Q. Would this happen to be that study, Plaintiffs'
21 Exhibit 1067?

22 A. I think this is a report of some of the work
23 that was in that -- in that overall project.

24 Q. This is called INVESTIGATION "OF EFFECTS OF
25 BRAND SWITCHING ON HUMAN SMOKING CHARACTERISTICS";

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1 correct?

2 A. The title, "INVESTIGATIONS OF EFFECTS OF BRAND
3 SWITCHING ON HUMAN SMOKING CHARACTERISTICS. PART
4 II. THE EFFECTS OF BRAND SWITCHING ON MEASURED HUMAN
5 SMOKING CHARACTERISTICS."

6 Q. Okay. Now the object of this --

7 "The objective of this work was three-fold";

8 correct?

9 A. You've read that accurately.

10 Q. "To test equipment and methodology developed for
11 the measurement of human smoking characteristics";
12 correct?

13 MR. PLESEC: Objection.

14 A. That's what it says.

15 Q. Well let me ask you something. You know, you
16 always say I've read that accurately. Is it your
17 understanding that this -- that this study is -- is
18 actually inaccurate and the only thing that's
19 accurate about this study is that I've read it
20 accurately but not that the study itself is
21 accurate?

22 A. All I'm trying to do is be extremely precise
23 into what I'm agreeing to or not. That's all.

24 Q. Well let me be extremely precise as well. Do
25 you have any information as you sit here today that

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1 would indicate that the work that these scientists
2 did, John Reynolds, Alan Norman and Leslie Gordon,
3 was inaccurate or wrong?

4 A. I'm not suggesting that. I haven't.

5 Q. Okay. As far as you know, the study here is
6 accurate and well done; correct?

7 A. My overall interpretation of this study is it
8 was a very good study.

9 Q. Okay. And the conclusions these people reach
10 are valid; correct?

11 MR. PLESEC: Objection.

12 A. My recollection -- it's been a long time since
13 I've looked at this particular report. My
14 recollection was that the conclusions drawn from the
15 data at hand were reasonable conclusions, and I think
16 it was a good research -- good piece of research.

17 Q. And the people who did the research were far
18 more capable of interpreting it than you are;
19 correct?

20 MR. PLESEC: Objection.

21 A. John Reynolds was certainly an expert in this
22 area. He developed methodology. He worried about
23 this problem day in and day out. I haven't had
24 direct responsibility for conducting this kind of
25 research.

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1 Certainly anybody that -- that has direct
2 responsibility for any piece of research is going to
3 worry about it, they're going to know more about it
4 than anybody else. They're going to be the experts
5 of that research.

6 Q. Okay. And the answer to my question, which was
7 "And the people who did the research were far more
8 capable of interpreting it than you are?" would be
9 yes?

10 MR. PLESEC: Objection.

11 A. I think that's a fair statement.

12 Q. Okay. Let's go back to the work. The second
13 objective of this study was "to detect and measure
14 differences in smoking characteristics among smokers
15 of brands of differing 'strengths'"; correct?

16 MR. PLESEC: Objection.

17 A. That's what it says.

18 Q. "And ... to determine the changes in smoking
19 characteristics made by smokers on switching between
20 brands of different 'strengths'"; correct?

21 MR. PLESEC: Objection.

22 A. That's what it says.

23 Q. Let's look under the "SUMMARY." The second
24 paragraph under the "SUMMARY" says "Differences in
25 smoking characteristics (e.g., puff volume, puffing

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1 frequency, puff duration, et cetera) among smokers of
2 brands differentiated as to 'strength' (i.e.,
3 full-flavor, fuller-flavor-low-'tar',
4 ultra-low-'tar') do exist and are consistent with the
5 idea that smokers adjust smoking characteristics on
6 the basis of perceived 'strength' or impact";
7 correct?

8 MR. PLESEC: Objection.

9 A. That's what it says.

10 Q. And do you understand that perceived strength or
11 impact is a function of nicotine delivery?

12 A. I think perceived strength or impact is
13 certainly very importantly a function of nicotine
14 delivery, but not the only function.

15 Q. But the primary function; correct?

16 MR. PLESEC: Objection.

17 A. I would say it's a very large function. I don't
18 know whether it's primary. I would say it's very
19 important.

20 Q. Most people would say very large is about the
21 same as primary; correct?

22 A. I would say --

23 MR. PLESEC: Objection.

24 A. -- it's very important.

25 Q. Okay. He then states or they then state that

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1 "Changes in smoking characteristics made by smokers
2 when switching among brands of different strengths
3 are consistent with the idea of 'compensation'";
4 correct?

5 A. Sure.

6 Q. It says "Smokers employ various tactics in
7 compensation, which depend upon the smoker's usual
8 brand and the brand to which he or she is switched";
9 correct?

10 MR. PLESEC: Objection.

11 A. That's what it says.

12 Q. "These tactics may be subtle in effect";
13 correct?

14 MR. PLESEC: Objection.

15 A. That's what it says.

16 Q. "In general, smokers habituated to a brand of a
17 given level of 'strength'" and "impact will modify
18 their smoking behavior to obtain less or more smoke
19 from a brand which is 'stronger' or 'weaker',
20 respectively, than their normal brand"; correct?

21 MR. PLESEC: Objection.

22 A. That's what it says.

23 Q. In other words, smokers modify their smoking
24 behavior to obtain a certain level of nicotine;
25 correct?

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1 MR. PLESEC: Objection.

2 A. I don't think that's exactly what they're
3 saying. My interpretation of this in the second
4 paragraph -- third paragraph -- paragraph is that
5 smokers do compensate if they're switched to either a
6 lower-tar or a higher-tar product than what they're
7 currently used to, that they puff differently and
8 will do that to increase or change -- and now we're
9 back to the second paragraph -- their perceived
10 strength or impact. And --

11 Q. The amount of nicotine?

12 A. -- as I said before, that's not the only thing.

13 Q. But that's --

14 A. Nicotine -- now wait a minute.

15 Nicotine is an important element, a very
16 important element, but it's not the only thing.

17 Q. Well what do you think the other things are?

18 A. I can change compensation behavior by changing
19 the pressure drop of the cigarette, keeping
20 everything else the same, including yields.

21 Q. I'm talking about the smoker, sir.

22 A. I am too.

23 Q. What else does --

24 A. I am talking about the --

25 Q. -- the smoker perceive?

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1 A. I am talking about the interaction between the
2 smoker and the cigarette. I can give a smoker a
3 cigarette -- two cigarettes that are equivalent and
4 differ only in the cigarette pressure drop, and the
5 smoker will smoke them differently and compensate for
6 that difference in -- in performance characteristic.

7 Q. But ultimately what is the component they're
8 trying to compensate for? What component have you
9 altered that they want more of or less of?

10 A. I am telling you they are getting exactly the
11 same everything, the same tar yield, the same
12 nicotine yield, but the pressure drop characteristics
13 of the cigarette can alter their puffing behavior.

14 Q. Right, but in the end they'll smoke both
15 cigarettes to get the same amount of tar and the same
16 amount of nicotine; correct?

17 MR. PLESEC: Objection.

18 A. I don't believe that's correct at all.

19 Q. You think they smoke them to get differing
20 levels of tar and nicotine?

21 A. I think they smoke cigarettes differently to get
22 the satisfaction they're looking for. I don't think
23 that they're trying to get equal levels of nicotine.
24 There's no evidence that -- that leads me to that
25 conclusion, that they're trying to get equal levels

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1 of nicotine.

2 Q. Well how do you define "satisfaction"? What
3 does a smoker perceive when they perceive, quote,
4 unquote, "satisfaction"?

5 A. I believe smokers consider a lot of things
6 subconsciously or without even really thinking about
7 it at all.

8 Q. Okay.

9 A. And one is certainly the delivery, the nicotine
10 level. There's certainly the taste characteristics
11 and the tar level. Different cigarettes do taste
12 differently. The pressure drop or degree of draw
13 resistance is extremely important. People will
14 adjust their -- their puffing behavior based on
15 nothing more than that physical aspect of the
16 cigarette, which ultimately affects their yields.
17 It's -- it's the entire package.

18 Q. Okay. Well let's go back to the report.

19 It states here that "Differences in smoking
20 characteristics" on -- under -- "among smokers" --

21 MR. PLESEC: Where are you? Where are you
22 reading from?

23 MR. O'FALLON: I'm reading from the
24 report.

25 MR. PLESEC: Yeah, but could you tell us

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1 where?

2 MR. O'FALLON: The first paragraph after
3 the introductory sentence, which I've already read
4 before.

5 Q. It states "Differences in smoking
6 characteristics ... among smokers of brands
7 differentiated as to 'strength' ... do exist and are
8 consistent with the idea that smokers adjust smoking
9 characteristics on the basis of perceived 'strength'
10 or impact." Now is it your testimony that when these
11 researchers use the word "strength," they are
12 referring to something other than nicotine?

13 A. I never said that.

14 MR. PLESEC: Objection.

15 Q. I'm asking you the question. When these --

16 A. I think --

17 Q. -- people are referring -- using and referring
18 to the word "strength," are they in fact referring to
19 nicotine?

20 MR. PLESEC: Objection.

21 A. I don't believe that they're referring
22 specifically to nicotine only. I think nicotine and
23 tar yield both are part of perceived strength and
24 impact. Nicotine is certainly very, very important,
25 as I've said. I don't think it's the only thing, and

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1 I don't believe that these researchers, especially
2 John Reynolds and Alan Norman, would have concluded
3 what you're trying to interpret.

4 THE REPORTER: Off the record, please, to
5 change tape.

6 (Discussion off the record.)

7 BY MR. O'FALLON:

8 Q. Why don't you turn to page 19 of the document,
9 last four Bates numbers 6422.

10 A. I'm there.

11 Q. Okay. Do you see capital letter C, "Regular
12 Brand Categories"?

13 A. I see that section.

14 Q. Do you see number one under that?

15 A. Yes.

16 Q. It states "In general, the smoking
17 characteristics of human smokers are different from
18 the FTC 'standard' smoking conditions"; correct?

19 A. That's --

20 MR. PLESEC: Objection.

21 A. That's what it says.

22 Q. So the FTC measures really don't tell anybody
23 what they individually will receive; correct?

24 MR. PLESEC: Objection.

25 A. The FTC -- the numbers measured by the FTC

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1 standard protocol does not in any way represent what
2 any human individual -- or what any individual smoker
3 will receive.

4 Q. Has Reynolds ever told the smoking public of
5 that fact?

6 MR. PLESEC: Objection.

7 A. Reynolds has not, to my knowledge, told the --
8 told the smokers that the FTC tar numbers do not
9 represent what any individual smoker will get. The
10 FTC has made that clear in several publications.
11 They made that clear when they established the
12 method. The FTC commissioner has reaffirmed that
13 multiple times since then. Now presently the FTC is
14 coming back, reconsidering that.

15 Q. Reynolds uses FTC measurements to sell its
16 cigarettes in advertisements; correct?

17 MR. PLESEC: Objection, assumes facts not
18 in evidence, lack of foundation.

19 A. I'm not sure I understand your question. Do we
20 report FTC numbers?

21 Q. More than that. Do you actually use FTC numbers
22 to market your cigarettes saying that, "Our numbers
23 are lower than 'X' brand"?

24 MR. PLESEC: Same objection.

25 A. For one of our brands, Now, we have used "lower

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1 than" as some advertising.

2 Q. Haven't you also used a similar campaign with
3 Vantage?

4 A. Vantage was probably the first successful
5 low-tar product in the U.S. --

6 Q. To the extent --

7 A. -- and we did use "lower than" or "less tar" as
8 a comparative measure.

9 Q. You would agree with me to the extent that those
10 advertisements suggest that a smoker will actually
11 receive less tar from that cigarette, those ads are
12 misleading; correct?

13 MR. PLESEC: Objection.

14 A. Less tar compared to what?

15 Q. Less tar compared to anything.

16 A. No, I don't agree --

17 MR. PLESEC: Same objection.

18 A. -- with that at all.

19 Q. Well let's see what these folks concluded.

20 Isn't it true that your own researchers in 1983
21 concluded that basically if you smoke a low-tar
22 cigarette and you come down from a full-flavor
23 cigarette, you'll smoke that low-tar cigarette in
24 such a way that you receive more tar and nicotine?

25 MR. PLESEC: Objection.

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1 A. Than what?

2 Q. Than you did from your full-flavor -- you'll --

3 You'll receive the same amount of tar and

4 nicotine from your low-tar cigarette as you did from

5 your full-flavor cigarette.

6 MR. PLESEC: Objection, assumes facts not

7 in evidence.

8 A. That's not what they concluded here. What they

9 found in this study and all the companion studies

10 that go with it is that people do compensate, no

11 question about it. The compensation is far from

12 complete, and as a switching study, if you take a

13 full-flavor smoker and you switch them to a low-tar

14 product, they will in fact take a higher puff

15 volume. They will puff more often, and the

16 consequence is that they will get more tar and more

17 nicotine than you would expect simply based on the

18 FTC numbers.

19 But there is not complete compensation, not

20 anywhere to the -- to the extent that you're

21 suggesting that they get the same yields. They don't

22 do it.

23 Q. Well you testified earlier this year that a

24 Dr. Byrd at R.J. Reynolds did a study of 100 people

25 and found almost complete compensation, did you not?

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1 A. I testified, if you'll look at the entire
2 transcript, that there's several pieces of
3 information and that our knowledge about the degree
4 of compensation is far from complete. Dr. Robinson
5 and Pritchard reviewed the bulk of the literature on
6 compensation, which was not R.J. Reynolds' work nor
7 industry work, and taken together eight major studies
8 of compensation suggested that people may compensate
9 somewhere to the middle, I would say 40 to 60 percent
10 compensation, not 100 percent and certainly not 0
11 percent. That was the summary of the literature.
12 Now let me finish, please.

13 The -- Reynolds has conducted two studies on
14 smoker intake, both by Byrd, recently. The
15 33-subject study, that was a limited study. It had
16 other -- well it had limitations not only because
17 there were only 33 subjects, but it had some
18 analytical limitations. That experiment concluded
19 almost no compensation.

20 Byrd came back and repeated the study with a
21 hundred subjects. There were some limitations and
22 problems with that study. The conclusions suggested
23 close to full compensation.

24 Taken together, we've got eight studies that
25 fall somewhere in the middle. We've got two Byrd

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1 studies that fall on either side of it dramatically,
2 and to me that points out that compensation can
3 occur, compensation does occur. It's certainly not
4 complete. I think more work needs to be done because
5 these studies, to me, tell me that this is a very
6 difficult experiment to conduct and get reproducible
7 consistent results.

8 Q. Is it your testimony that in the last 40 years
9 there have been only eight studies on smoking
10 compensation?

11 MR. PLESEC: Objection.

12 A. That's not what I said. I said that Reynolds --
13 I mean, Robinson -- John Robinson and Wally
14 Pritchard, both research scientists at Reynolds,
15 evaluated the literature. They looked at these eight
16 studies, found that these eight studies together
17 were -- well I didn't testify to this -- were of
18 similar methodology that they could be compared. I
19 didn't say that -- or I certainly didn't mean to say
20 that those were the only eight studies in the
21 literature.

22 Q. How many studies have there been on smoker
23 compensation?

24 A. I have no idea. You'll have to ask John
25 Robinson. He's the expert.

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1 Q. And they just happened to pick eight out?

2 MR. PLESEC: Objection.

3 A. I think you --

4 Q. Did they pick out the eight that favored what
5 they wanted to testify to, which -- which is that
6 it's not clear whether there's smoking compensation,
7 or did they do a fair and objective analysis of all
8 the literature?

9 MR. PLESEC: Objection.

10 A. Well I resent that suggestion tremendously
11 because I know Dr. Robinson personally. He's an
12 excellent scientist. Dr. Robinson would not cherry
13 pick.

14 Q. Do you know that for a fact?

15 A. I know John -- John Robinson --

16 Q. Okay.

17 A. -- extremely well. I know that for a fact.

18 Q. Well list the eight studies he picked.

19 A. I'm sorry?

20 Q. List them.

21 A. Well I can't off the top of my head. I would
22 have to go back to his publication.

23 Q. You would agree that the whole issue of
24 compensation has a great deal of impact on whether
25 your opinions in this case have any validity;

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1 correct?

2 MR. PLESEC: Objection.

3 A. I don't understand that question.

4 Q. Well let's put it this way: Your testimony is
5 that in 1950 or in the 1950s the average tar level of
6 a cigarette was 38; correct?

7 A. That's approximately right.

8 Q. And that the average nicotine level at that time
9 was 2.8; correct?

10 A. That's approximately right.

11 Q. You now say that the average tar level is 12;
12 correct?

13 A. That's right.

14 Q. And that the average nicotine level is 9;
15 correct?

16 A. It's about .8 to .9, .8.

17 Q. Well I believe you've testified previously or
18 you state in your report it's .9. Is your report
19 wrong?

20 A. I think .8 to .9 is a reasonable estimate from
21 the sales-weighted tar numbers.

22 Q. Well let's look at your own report.

23 A. All right. Let's do that.

24 Q. Why don't you look on page five of your report.

25 A. I don't know what's happened to it.

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1 Q. Do you want to go to the top of page five, the
2 first full sentence.

3 A. All right. The first full sentence says "Today,
4 the sales-weighted market average yields are about 12
5 and about 0.9 milligrams per cigarette, based on the
6 FTC method."

7 Q. And that was what you wrote in this expert
8 report; correct?

9 A. That's what I wrote in that expert report.

10 Q. Okay. Now I want you to assume for a minute
11 that the average smoker both today and in the 1950s
12 smoked to get 1.3 milligrams of nicotine. Okay?

13 A. Why should I --

14 Q. Do you have that number?

15 A. Why should I assume that?

16 Q. You can just do it for the sake of this. Why
17 don't you write that down.

18 A. So you want me to assume that the average
19 smoker -- I just want to make sure I understand.

20 Q. Smokes to achieve a level of 1.3 milligrams of
21 nicotine. Okay?

22 A. Okay. Okay.

23 Q. Based on the numbers from 1950, how much tar
24 would that smoker receive?

25 MR. PLESEC: Objection.

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1 A. Well, that would be the equivalent of about a
2 half a cigarette nicotine, so roughly half a
3 cigarette of tar.

4 Q. Well why don't you do the actual calculations.

5 A. What actual calculations are you looking for?

6 Q. Well, tell me what a smoker in the 1950s who
7 smoked to achieve a level of 1.3 milligrams of
8 nicotine would have achieved in terms of tar.

9 A. I don't know what -- what you're talking about.
10 Are you talking about blood levels of nicotine or are
11 you talking about intake levels? Just help me out.

12 Q. Total intake levels. It will eventually
13 translate into a blood level, but just total intake
14 levels, that they're going to intake 1.3 milligrams
15 of tar. Okay? Why don't you just assume that for me
16 and do the calculation.

17 A. But I can't estimate a tar yield if you give me
18 an intake of 1.3 because people smoke in -- in
19 vari --

20 Q. I'm asking you to --

21 A. -- in variable ways.

22 Q. Sir, I'm asking you to assume a smoker is
23 smoking to achieve a tar -- a -- a nicotine level per
24 cigarette of 1.3. Could you just --

25 A. And you're talking about serum blood levels

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1 then.

2 Q. No, I'm not.

3 A. You're talking about a level or an intake? I'm
4 trying to understand. That's all.

5 Q. Well I think you're trying not to understand.

6 A. No, I am.

7 MR. PLESEC: Objection. You're arguing
8 with the witness now.

9 THE WITNESS: All right. Let's take a
10 break.

11 MR. O'FALLON: This is not that hard.

12 THE REPORTER: Off the record, please.

13 (Recess taken.)

14 BY MR. O'FALLON:

15 Q. When the FTC measures nicotine and tar, they
16 make certain assumptions about the amount of smoke
17 that a smoker's going to get; correct?

18 A. No. The FTC test method was developed to
19 provide a comparative measure, not to in any way
20 estimate what any smoker really gets.

21 Q. I'm going to ask you to listen closely to my
22 question. I said the -- when the FTC measures
23 nicotine and tar, they make certain assumptions about
24 the amount of smoke that they're going to measure.

25 Correct? I mean, they basically say, "Here is a

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1 standard amount of smoke, and for this standard
2 amount of smoke we're going to measure how much tar
3 and nicotine is in this standard amount of smoke";
4 correct?

5 MR. PLESEC: Objection. The question that
6 you originally put to the witness was does the FTC
7 measure -- measure the amount of smoke that a smoker
8 was going to get, and he answered that way.

9 MR. O'FALLON: Well the -- the question
10 will stand for itself.

11 MR. PLESEC: Well --

12 MR. O'FALLON: I've asked this question.
13 Okay?

14 MR. PLESEC: -- let the record stand.

15 A. Well let me describe I think very quickly the
16 FTC. The FTC test method has a prescribed volume,
17 frequency and duration which defines the total amount
18 of smoke or the total amount of volume drawn from a
19 cigarette during the course of its burning.

20 Q. And we know that that amount may have very
21 little to do with what any individual smoker will
22 actually receive because they can adjust all of those
23 parameters themselves; correct?

24 MR. PLESEC: Objection.

25 A. The FTC test method does not represent what any

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1 individual smoker does when he smokes a cigarette or
2 even certainly from smoker to smoker or within
3 smokers as well.

4 Q. Because each smoker will at some point adjust
5 the total volume of smoke they receive; correct?

6 MR. PLESEC: Objection.

7 A. Smokers change the volume -- the puff volume,
8 frequency, duration as well as in some cases may not
9 smoke the entire cigarette. There are a number of
10 variables that are particular to -- to human smoking
11 that are not in the FTC smoking protocol.

12 Q. But all of those different parameters ultimately
13 go to the total volume of smoke a smoker receives
14 from any given cigarette; correct?

15 MR. PLESEC: Objection.

16 A. Puff volume, frequency, duration, number of
17 puffs all determine the total volume taken on the
18 cigarette.

19 Q. Right. Now what I want you to assume is that a
20 smoker smokes to receive an amount of smoke that will
21 give them a total volume of nicotine of 1.3
22 milligrams. Okay?

23 A. Volume and milligrams are inconsistent.

24 Milligrams is a weight. I'm sorry, I'm just trying
25 to make sure that we're very precise here.

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1 Q. I want you to assume that a smoker smokes
2 whatever volume of smoke is necessary to get 1.3
3 milligrams of nicotine in that volume of smoke.

4 Okay? Can we -- can we do that?

5 A. Okay.

6 Q. Are you okay with that?

7 A. I can make that assumption, I suppose. I
8 don't --

9 Q. Okay.

10 A. -- understand why, but --

11 Q. Well, we're going to get to that.

12 A. Okay.

13 Q. Now, if a smoker in -- in the 1950s smoked a
14 volume of smoke so that they would get 1.3 milligrams
15 of nicotine out of that smoke, what volume of tar
16 would they get out of that same volume of smoke?

17 What amount --

18 MR. PLESEC: Objection.

19 Q. -- of tar would they get out of that same volume
20 of smoke?

21 MR. PLESEC: Objection.

22 A. If we assume that a smoker smokes a cigarette to
23 get from the cigarette in the smoke 1.3 milligrams of
24 nicotine for that cigarette, then the tar level they
25 get will be affected to a degree by how they had to

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1 puff to get that nicotine. I'm not trying to confuse
2 it. I'm just trying to make it clear that things are
3 more complicated. If you want to assume --

4 Q. What --

5 A. -- some other simplistic -- simplistic
6 assumptions, we can do that as well, which will
7 simplify I think maybe what you want to do.

8 Q. What assumptions, what simplistic assumptions,
9 do we need to make in order to get to that point?

10 A. Well maybe I don't understand what it is -- what
11 it is you're trying to -- trying to ask me. Maybe I
12 guess I don't.

13 Q. If a smoker smokes in the 1950s in order to get
14 1.3 milligrams of nicotine in their volume of
15 smoke --

16 A. Out of one cigarette.

17 Q. -- what is the amount of tar they're going to
18 get out of that same volume of smoke?

19 A. If under their puffing conditions the
20 tar-to-nicotine ratio is reflected by the
21 tar-to-nicotine ratio from machine smoking, then they
22 should get, oh, what, 20, 22 milligrams, I would
23 guess, half of what the -- let's assume the
24 cigarette -- let's make some other assumptions.

25 Let's assume the cigarette that they're smoking under

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1 FTC would deliver 2.6 milligrams total yield and 40
2 milligrams of tar total yield.

3 Q. Well no, let's use the numbers that are in your
4 report. Okay?

5 A. Okay.

6 Q. So let's say we've got 1.3 milligrams of
7 nicotine and we're trying to find X, which is the
8 amount of tar. And to do that, we're going to
9 compare that to 2.8 milligrams of nicotine over, I
10 believe yours says, 38. Now maybe this is --

11 A. Okay.

12 Q. -- my oversimplistic math, but let's mark this
13 as the next exhibit.

14 (Plaintiffs' Exhibit 4807 was marked
15 for identification.)

16 BY MR. O'FALLON:

17 Q. Plaintiffs' Exhibit 48 shows the equation that I
18 was just talking about. Can you please solve that
19 for X.

20 THE REPORTER: It's Exhibit 4807.

21 MR. O'FALLON: That's Exhibit 4807.

22 (Witness complies.)

23 Q. And what does X equal?

24 A. Approximately 15.

25 Q. Okay. I want you to now go to 1994 and I want

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1 you to assume that a smoker in 1994 still has the
2 same nicotine requirement; that is, they still are
3 smoking and taking in that volume of smoke that would
4 give them 1.3 milligrams of nicotine from that
5 cigarette, and I would like you to solve X in that
6 equation, and I'm going to have this marked as the
7 next exhibit.

8 (Plaintiffs' Exhibit 4808 was marked
9 for identification.)

10 BY MR. O'FALLON:

11 Q. I'm going to hand you Plaintiffs' Exhibit 4808,
12 which sets out my equation, and ask you to solve for
13 X.

14 (Witness complies.)

15 Q. And what is X equal to?

16 A. Approximately 16.8.

17 Q. So if we assume that a smoker in 1950 smoked a
18 cigarette in order to receive 1.3 milligrams of
19 nicotine and then smoked in 1990 to receive the same
20 amount, 1.3 milligrams of nicotine, that smoker would
21 actually receive about the same amount of tar in 1990
22 as they did in 1950; correct?

23 A. If the assumption --

24 MR. PLESEC: Objection.

25 A. If the assumption that they were smoking to the

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1 same 1.3 nicotine and if the assumption stands that
2 their change in puffing behavior maintained
3 tar-to-nicotine ratios. We know that tar-to-nicotine
4 ratios are affected to a degree by puffing behavior
5 as well.

6 Q. But again I believe it's your testimony that the
7 tar-to-nicotine ratios are not affected a great deal;
8 correct?

9 A. By puffing condition? My testimony was that
10 tar-to-nicotine ratios haven't been affected
11 substantially by the tar reduction program, through
12 the general reduction program. One can get different
13 tar-to-nicotine ratios when they puff differently.

14 That has a -- an effect on it.

15 Q. But basically --

16 A. All I'm saying is that what you've -- what
17 you've led me through here requires the assumption
18 that a smoker smokes to the same -- to get the same
19 1.3-milligram-per-cigarette intake of nicotine and
20 requires that they don't change the performance
21 characteristics of the cigarette by taking bigger or
22 smaller puff volumes.

23 Q. When is the first time R.J. Reynolds did studies
24 to determine the plasma nicotine levels that smokers
25 received from smoking given cigarettes?

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1 A. Gosh, I don't know the first time. There have
2 been a number of studies. The Byrd studies, for
3 example, that we just referred to before the break
4 was an addition to the literature because it's
5 primarily a more complete analysis of nicotine
6 metabolites in urine. Researchers up to that point
7 had never looken -- looked at the full range of
8 nicotine metabolites as Dr. Byrd did. He developed
9 analytical methodology to do that.

10 But R.J. Reynolds has done quite a lot of smoker
11 studies where they've measured nicotine, nicotine
12 metabolites in body fluids or nicotine measures in
13 body fluids, as well as other things in body fluids.
14 I can't give you when the first time was.

15 Q. Generally the metabolite that's looked at in
16 order to determine the amount of nicotine in blood is
17 cotinine; right?

18 A. Cotinine is the --

19 MR. PLESEC: Objection.

20 A. Cotinine is the primary metabolite. It's not
21 the only, and at least our scientists have concluded
22 that it's dangerous to look only at cotinine because
23 of individual-to-individual differences, that it's
24 much better to look at a series of -- of
25 metabolites.

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1 Q. Has Dr. Byrd now published his 100-smoker
2 study?

3 A. It is in the press.

4 Q. Okay. Are there copies of that study available
5 in R.J. Reynolds?

6 A. Manuscripts are certainly available within R.J.
7 Reynolds.

8 Q. Okay.

9 MR. O'FALLON: Could I have that produced?

10 MR. PLESEC: We'll take that under
11 consideration.

12 Q. Is that something you'll be relying on at
13 trial?

14 A. That's not what I had anticipated getting into
15 in trial. It may well be that -- I mean, I just
16 really don't know.

17 Q. I'd like to hand you a document that's been
18 previously marked as Plaintiffs' Exhibit 1111.

19 Plaintiffs' Exhibit 1111 is a document Bates stamp
20 numbered 50897 8013 through 8025.

21 Have you seen this document previously?

22 (Witness reviews Plaintiffs'
23 Exhibit 1111.)

24 A. No, I don't recall seeing this document before.

25 Q. Okay. Are any of the people listed on the front

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1 people out of the departments you've worked in --

2 you've worked in?

3 A. These are all individuals from the research and
4 development department.

5 Q. Okay. Were you not part of the product
6 technology and development department?

7 A. Where do you see product technology?

8 Q. Look on the front, James Phillips. Do you see
9 all the various --

10 A. Oh, I see.

11 Q. Do you see all the various departments listed
12 there?

13 Have you been a member of any of the departments
14 listed on the front of this memo?

15 A. This is -- these are terms from an older
16 organization of ours, older organizational structure,
17 and these individuals are from different parts of the
18 organization that include these titles. I've been
19 involved with some of them over the years.

20 Q. Okay. So you've been involved in some of these
21 departments?

22 A. Well I'm presently responsible for analytical
23 chemistry. I'm presently responsible for product
24 development.

25 Q. Do you know the approximate time period of this

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1 document? I do see a reference to 1989, but other
2 than that, I don't see an actual date on this
3 document.

4 A. I would have to guess that it was probably -- my
5 best guess from the terms that are used on the cover
6 page would put it at 1990.

7 Q. Okay. And during that time period you were
8 responsible for conducting and supervising research
9 in the areas of smoke formation, cigarette design and
10 performance, material development for advanced
11 technology products, and new product development;
12 correct?

13 A. Sounds right.

14 Q. Would Harvey Young have been under you at that
15 point in time?

16 A. No, Harvey Young was -- worked a lot in process
17 development.

18 Q. Okay. How about any of the other people on
19 here? Would any of the other people have been under
20 you at the time?

21 A. In 1990?

22 Q. Yes.

23 A. I don't believe any of these people reported to
24 me in 1990.

25 Q. Let's look on the first full page, not the cover

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1 page. The title of this document is called "THE
2 OVER-SMOKING ISSUE"; correct?

3 A. That's the title.

4 Q. And in parentheticals, "(Tar to Nicotine
5 Ratio)"; correct?

6 A. Uh-huh.

7 Q. It states "It has been argued for several years
8 that low tar and ultra-low tar cigarettes are not
9 really what they are claimed to be"; correct?

10 A. That's right, that's what it says.

11 MR. PLESEC: Objection.

12 Q. It says "Numerous investigators from the United
13 States, Canada and the United Kingdom have studied
14 the way in which smokers smoke full flavor ... full
15 flavor low tar ... and ultra-low tar ... cigarettes
16 and have concluded that," and then they list the
17 conclusions; right?

18 MR. PLESEC: Objection.

19 A. That's what it says.

20 Q. The first conclusion that's listed is that "Each
21 individual smoker has his or her own nicotine
22 requirement from each cigarette"; correct?

23 MR. PLESEC: Objection.

24 A. That's what number one says.

25 Q. "2. Virtually all cigarettes can be made to

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1 yield the desired amounts of nicotine depending on
2 the size of the puff taken and the extent to which
3 the puff is inhaled"; correct?

4 MR. PLESEC: Objection.

5 A. That's what it says.

6 Q. In parentheticals it says "(This is referred to
7 by some as the smoking maneuver)"; correct?

8 MR. PLESEC: Objection.

9 A. That's correct, what it says.

10 Q. It then says that the tar -- "The amount of tar
11 yielded by a full-flavor, full-flavor/low-tar or ...
12 ultralow-tar cigarette (per milligram of nicotine) is
13 not appreciably affected by the smoking maneuver";
14 correct?

15 MR. PLESEC: Objection.

16 A. That's what it says.

17 Q. Okay. "In other words, for a cigarette that
18 yields one milligram of nicotine and 14 milligrams of
19 tar under FTC smoking conditions the tar to nicotine
20 ratio ... is 14 and this ratio remains relatively
21 constant no matter how the smoking maneuver differs
22 from FTC conditions"; correct?

23 MR. PLESEC: Objection.

24 A. That's what it says.

25 Q. It says "For this cigarette, the smoker will

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1 receive 14 times as much tar as he does nicotine no
2 matter how he smokes it"; correct?

3 MR. PLESEC: Objection.

4 A. That's what it says.

5 Q. All those concepts are concepts you and I have
6 discussed in going over the last couple of exhibits;
7 correct?

8 MR. PLESEC: Objection.

9 A. We've touched on these issues.

10 Q. Okay. And these conclusions that are listed
11 here in this document are based on numerous
12 investigators from the United States, Canada and the
13 United Kingdom; correct?

14 MR. PLESEC: Objection.

15 A. That's what the first paragraph says.

16 Q. Okay. He then states that "Applying the above
17 conclusions to an ultralow-tar cigarette (the
18 argument can be" --

19 MR. PLESEC: Objection. Who -- who is
20 "he"?

21 MR. O'FALLON: I don't know who wrote this,
22 sir.

23 MR. PLESEC: There doesn't appear to be an
24 author attached to this.

25 MR. O'FALLON: Do you want me to look at

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1 the 4B and get back to you tomorrow morning?

2 MR. PLESEC: Yeah. Well you said "he," and
3 I thought you had some idea who the -- the author
4 was.

5 MR. O'FALLON: Well I can go back and
6 look.

7 BY MR. O'FALLON:

8 Q. Do you have any idea who the author is, sir?

9 A. I really don't.

10 Q. Okay. It says "Applying the above conclusions
11 to an ultralow-tar cigarette (the argument can be
12 constructed) that ultralow-tar advertising is
13 misleading to the smoker"; correct?

14 MR. PLESEC: Object.

15 A. That's what it says.

16 Q. And then they go through and basically point out
17 why it would be misleading; correct?

18 MR. PLESEC: Object.

19 (Witness reviews Plaintiffs'
20 Exhibit 1111.)

21 Q. Let me know when you're done, and we'll go back
22 and I'll ask questions. Okay?

23 A. Okay. I just wanted to go through --

24 Q. No, read it --

25 A. -- the -- the text.

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1 Q. -- read it to the extent you need.

2 A. Okay.

3 (Witness continues reviewing Plaintiffs'

4 Exhibit 1111.)

5 Q. Okay?

6 A. Okay. What's your question?

7 Q. Let's go back to the first page -- page. The
8 assumptions that are put together are very similar to
9 the assumptions I asked you to make here; correct?

10 If we're looking on the first page in that second
11 section, it says first "Assume a ULT," an
12 ultralow-tar cigarette, "has an FTC yield of 0.4
13 milligrams of nicotine and 5.6 milligrams of tar";
14 i.e., a tar-to-nicotine ratio of 14; correct?

15 MR. PLESEC: Objection.

16 A. That -- yeah, that's what that says.

17 Q. Okay. It says "Now assume that a full-flavor
18 smoker (who has been smoking a cigarette that yields
19 1 milligram of" tar "and 14 milligrams of tar under
20 FTC conditions) decides to switch to" an
21 "ultralow-tar cigarette described above"; correct?

22 MR. PLESEC: Objection.

23 A. No, that's not correct. You said "tar" when you
24 should have said "1 milligram of nicotine."

25 Q. You're right. I'm sorry. Let me go back.

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1 "Now assume that a full-flavor smoker (who has
2 been smoking a cigarette that yields 1 milligram of
3 nicotine and 14 milligrams of tar under FTC
4 conditions) decides to switch to the ultralow-tar
5 cigarette described above"; correct?

6 MR. PLESEC: Objection.

7 A. That's what it says.

8 Q. It says "Further assume (as has been claimed)
9 that this smoker's nicotine requirement is one
10 milligram per cigarette"; correct?

11 MR. PLESEC: Objection.

12 A. That's what it says.

13 Q. He then states that "If he adjusts his smoking
14 maneuver so that he obtains one milligram of nicotine
15 from the ULT cigarette and if the tar-to-nicotine"
16 ratio "does not change with his altered smoking
17 maneuver, then he will" receive "14 milligrams of tar
18 from the ultralow-tar cigarette"; correct?

19 MR. PLESEC: Objection.

20 A. That's what it says.

21 Q. In other words, tar follows nicotine, and if
22 he's smoking to a certain level of nicotine, he will
23 get the same amount of tar from either a
24 full-flavored cigarette or an ultralow-tar cigarette;
25 correct?

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1 MR. PLESEC: Objection.

2 A. To a first approximation, that's correct. That
3 does assume the T/N ratio doesn't change with altered
4 puffing behavior.

5 Q. Okay. And again that's one of the conclusions
6 that numerous investigators reached in number three
7 above, right, that "The amount of tar yielded ... is
8 not appreciably affected by the smoking maneuver"?

9 Right?

10 MR. PLESEC: Objection.

11 Q. "The amount of tar yielded ... (per milligram of
12 nicotine) is not appreciably affected by the smoking
13 maneuver."

14 MR. PLESEC: Objection.

15 MR. O'FALLON: What's your objection?

16 MR. PLESEC: Form of your question.

17 A. I wouldn't -- I wouldn't agree with that because
18 we do know that to -- to -- it's not a huge effect,
19 but we do know that puff volume and puff frequency
20 both can affect tar-to-nicotine ratio.

21 Q. But --

22 A. It doesn't dramatically change it, but it
23 affects it.

24 Q. Okay. And when you say doesn't dramatically
25 affect it, what would be the percentage effect that

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1 it would have, give or take?

2 A. Well that depends on how you do it, which --

3 which you're changing --

4 Q. What would be the maximum --

5 A. -- and for which side.

6 Q. -- percentage change in the tar-to-nicotine

7 ratio?

8 A. Percentage of the ratio?

9 Q. Uh-huh.

10 A. I said it will be small. I don't know.

11 Q. Okay. So if -- if the normal tar-to-nicotine

12 ratio was 14, what's the lowest the tar-to-nicotine

13 ratio would go based on a change in the smoking

14 maneuver?

15 MR. PLESEC: Objection.

16 A. Well I'd really have to go back and look at some

17 data to -- to -- where we've used a computer-driven

18 smoking machine to try to estimate things like that.

19 I can just give you a ballpark figure. I'd say plus

20 or minus 1.

21 Q. Okay. So if you've got a -- a tar-to-nicotine

22 ratio of 14, the smoking maneuver could alter that to

23 go down to 13 or up to 15?

24 A. That's a ballpark guess, yeah.

25 Q. Let's bring this analysis back to your testimony

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1 about the reductions in tar over time. If they're
2 right that a smoker smokes to achieve his or her own
3 nicotine requirement, then in fact a smoker smoking a
4 cigarette today, assuming the tar-to-nicotine ratio
5 is basically the same as it was in 1950, will see --
6 will receive the same amount of tar today as they
7 would have received in 1950 assuming they're smoking
8 to a given level of nicotine; correct?

9 MR. PLESEC: Objection, assumes facts not
10 in evidence.

11 A. I think to a first approximation, if you make
12 the assumption that you seem to be making, which is a
13 hundred percent compensation, that if one changes
14 cigarette designs lower or higher, if the assumption
15 is a hundred percent compensation, that you -- that a
16 smoker has a given target intake of nicotine and will
17 adjust accordingly to ensure that they get that
18 target intake of nicotine, if that's true, which
19 frankly I don't really believe, but if that were
20 true, then the tar intake would also be the same
21 pretty much to a first approximation given the
22 caveats we've said about change -- small changes in
23 T/N ratios and -- and the like.

24 Q. So when you testify about the general reduction
25 in all the various smoke constituents from 1950 to

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1 the present, if we assume that a person smokes for a
2 certain level of nicotine, all of those reductions
3 would really be irrelevant because they would receive
4 the same amount of tar today as they would have in
5 1950 assuming that they have the same nicotine
6 requirement; correct?

7 MR. PLESEC: Objection.

8 A. Well I think you're asking me the same question
9 again, if I understand you correctly. I'll try to
10 answer it again.

11 If one assumes that there is a target desired
12 intake or -- yeah, intake from the cigarette of
13 nicotine for a given smoker and that that smoker will
14 adjust their smoking behavior to achieve a hundred
15 percent compensation; that is, always get the same
16 nicotine intake, then to a first approximation they
17 would have roughly the same tar intake.

18 Q. Okay. Now the one way to change that, to alter
19 that, and to have a smoker today actually receive
20 less tar than they did in the 1950s would be to
21 change the tar-to-nicotine ratio; correct?

22 MR. PLESEC: Objection.

23 A. Changing the tar-to-nicotine ratio would affect
24 our analysis given the assumptions we tagged on to
25 it. I personally don't believe that smokers

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1 compensate a hundred percent. I believe that
2 cigarette smokers do compensate if they're switched
3 down to lower-tar products, lower-nicotine products
4 or if they're switched up to higher-tar and
5 higher-nicotine products, but I don't believe the
6 compensation's complete. I also believe that based
7 on personal experience because I've switched and I
8 know what I've done.

9 Q. Well have you had your own plasma level tested?

10 A. No, but I know that today as a smoker of an
11 ultralight product, I do not like and will not smoke
12 full-flavor lights products. They're too strong. I
13 don't like them.

14 Q. But you don't --

15 A. And I know I don't compensate.

16 Q. But what --

17 You really don't know whether or not you get
18 more or less nicotine, though, I mean, because you
19 haven't had the test done; right?

20 A. I haven't had my blood analyzed if that's what
21 you mean, but I know that I will not smoke those
22 products because I cannot compensate and get the
23 levels that I want. If -- if compensation were a
24 hundred percent complete, a smoker ought to be able
25 to switch from one category to another to another

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1 without really any significant difficulty. I have
2 difficulty switching cigarettes from category to
3 category.

4 Q. Let's take a look at the -- at some of the rest
5 of the conclusions that these -- that whoever wrote
6 this article reached.

7 On the next page it's stated that "In order to
8 illustrate these points we can utilize data from
9 studies by Teeuwen" -- am I pronouncing that right;
10 do you know?

11 A. I really don't no.

12 Q. "And" -- and "Russell." It said "Teeuwen
13 studied smokers of cigarettes whose FTC yield of
14 nicotine varied from 0.1 milligrams to 1.2 milligrams
15 and whose FTC yield of tar varied from 1.0 to 16
16 milligrams. The tar-to-nicotine ratio of these
17 cigarettes ranged from 5 ... to 14.5 The data
18 in Table II are consistent with" the "'oversmoking'
19 argument" -- "argument in the following ways."

20 First bullet point: "There is no statistically
21 significant difference in the number of cigarettes
22 smoked per day ... for any of the brands in spite of
23 a twelve fold range in FTC nicotine yield from high
24 to low"; correct?

25 MR. PLESEC: Objection.

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1 A. That's what it says.

2 Q. Okay. Bullet point two: "With the exception of
3 the smokers of the lowest nicotine yield"
4 cigarettes "... there was no statistically
5 significant difference in the circadian mean plasma
6 nicotine concentration ... of any of the smokers
7 (Note: this suggests that these smokers were
8 'self-titrating' with nicotine to essentially the
9 same 'dose')"; correct?

10 MR. PLESEC: Objection.

11 A. That's what it says.

12 Q. And again they're measuring the circadian mean
13 plasma nicotine concentration. That's the blood --
14 the blood level; correct?

15 MR. PLESEC: Objection.

16 A. That would be my take on it.

17 Q. "The tar index (TI) which is an indicator of the
18 amount of tar that each smoker obtained per day is
19 approximately the same (280 to 375) for the first
20 four cigarettes"; correct?

21 MR. PLESEC: Objection.

22 A. That's what it says.

23 Q. It then says "Smokers of the 0.1 milligram
24 nicotine cigarette have a TI of less than half ... of
25 the smokers" -- than -- "less than one-half that of

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1 the smokers of cigarettes with 1.0 milligram nicotine
2 or greater"; correct?

3 MR. PLESEC: Objection.

4 A. That's right. That's what it says.

5 Q. It then says "These smokers either had a lower
6 requirement for nicotine," parenthetical, "(their Nc
7 was also less than one-half that of smokers of higher
8 nicotine cigarettes)," end parenthetical, "or more
9 likely, the cigarette was so air diluted that they
10 could not further adjust their smoking maneuver to
11 obtain more nicotine"; correct?

12 MR. PLESEC: Objection.

13 A. That's what it says.

14 Q. And this document is consistent with the notion
15 that at least as to ultralow-tar cigarettes, it's --
16 it is hard to 100 percent compensate; correct?

17 MR. PLESEC: Objection.

18 A. Well I think that's one interpretation of the
19 last paragraph you read. I guess, you know, in going
20 through this document, it seems to me that this is
21 a -- a literature survey of some sort.

22 Q. It certainly --

23 A. So I --

24 Q. -- appears to be.

25 A. Yes.

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1 Q. I mean, a literature survey of apparently
2 literature that was published --

3 A. It even --

4 Q. -- in United States, Canada and the United
5 Kingdom. I mean, that's what --

6 A. Yeah.

7 Q. -- it says, by numerous investigators; right?

8 A. Yeah, and so it's like the first page was a
9 summary of some unknown or unreferenced work and then
10 now we're to Teeuwen, which is referenced.

11 Q. Right. The first page --

12 A. But at least -- at least given -- given what --
13 what is said here, I think that's -- that last
14 paragraph would certainly suggest that if a cigarette
15 were so air diluted, that it may not be possible to
16 adjust the smoking maneuver to obtain more nicotine.

17 Q. And just to --

18 A. I don't happen to believe that, but okay.

19 Q. Okay. And just to clarify your previous
20 comment, it does appear based on your review of this
21 document that in fact the first page is a summary of
22 numerous works by numerous investigators in at least
23 three countries; correct?

24 A. Well they reference three countries. It does
25 appear to be a compilation of an unknown number of

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1 reports in the literature, yeah.

2 Q. And the number is listed as numerous, though,
3 right, numerous investigators?

4 A. It says "Numerous investigators."

5 Q. Okay. And then if we look at the last bullet
6 point on page two, it states that "Smokers of the
7 0.2 milligram nicotine" cigarettes "while having an
8 NC as high as that of smokers of 1.2 milligram
9 nicotine cigarettes have a TI only one-third as
10 high This is because the tar-to-nicotine ratio
11 of the 0.2 milligram ... cigarette is only
12 approximately one-third as high (5 versus 13.3) as
13 the 1.2 milligram nicotine cigarette"; correct?

14 MR. PLESEC: Objection.

15 A. That's what it says.

16 Q. And again that would support the notion that if
17 you want to actually increase the tar that a smoker
18 receives, you have to really reduce the
19 tar-to-nicotine ratio; correct?

20 MR. PLESEC: Objection.

21 A. I'm sorry, say that again.

22 Q. Certainly. And that would support the notion
23 that if you want to actually -- you're right, I -- I
24 misspoke.

25 And that would support the notion that if you

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1 want to actually decrease the tar that a smoker
2 receives, you would have to really reduce the
3 tar-to-nicotine ratio; correct?

4 MR. PLESEC: Objection.

5 A. That would suggest that that's one way to do
6 it.

7 Q. Okay. Then they go on and state that "A similar
8 argument is derived from data published by
9 Dr. M.A.H. Russell"; correct?

10 A. That's right.

11 Q. Have you --

12 A. That's what it says.

13 Q. -- heard of Dr. Russell?

14 A. Yes, of course.

15 Q. He's pretty famous; right?

16 A. Quite so.

17 Q. 1. The tar-to-nicotine ratio of the low tar
18 cigarettes (10.8) was a highly significant" 12
19 percent -- was highly -- "was a highly
20 significant" -- and then it gives a significant
21 number -- "12.1 percent lower than the
22 tar-to-nicotine ratio of the non-low-tar cigarettes"
23 at "(12.3)"; correct?

24 MR. PLESEC: Objection.

25 A. You read that right.

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1 Q. Okay. Let's just look at the conclusion on the
2 last page. We're getting close to the end of the
3 day.

4 A. Are you -- you skipped number two?

5 Q. I did, but do you want to read that?

6 A. I just -- just read it.

7 Q. Okay. The last paragraph of this article on
8 page Bates number 8016 states that "The results of
9 both these studies are consistent with the
10 propositions that:

11 "1. Smokers of low yield cigarettes adjust
12 their smoking maneuver to obtain some desired level
13 of nicotine and therefore concomitantly increase
14 their tar intake"; correct?

15 MR. PLESEC: Objection.

16 A. That's what it says.

17 Q. It then says "The somewhat lower tar-to-nicotine
18 ratio of low yield cigarettes insures a lower tar
19 intake in a smoker who switches to lower tar
20 cigarettes even if he adjusts his smoking maneuver to
21 obtain more nicotine"; correct?

22 MR. PLESEC: Objection.

23 A. That's what it says.

24 Q. Number one, would that be consistent with
25 Dr. Byrd's most recent study?

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1 MR. PLESEC: Objection.

2 A. "Smokers of low yield cigarettes adjust their
3 smoking maneuver to obtain some desired level of
4 nicotine and therefore concomitantly increase their
5 tar intake." Which Byrd study are you referring to?

6 Q. The last one, the hundred-person study.

7 A. The -- the notion of compensation to obtain some
8 desired level of nicotine, which harkens back to some
9 of your earlier questions, assuming a certain target
10 desired intake level, is not inconsistent with what
11 Byrd found in the hundred-subject study, which is the
12 second study. As I indicated, there was some
13 statistical difference among some of the cells. If
14 you haven't read -- read the full manuscript, you
15 should. There was --

16 Q. I don't have it.

17 A. Okay. There was some statistically significant
18 difference among some of the cell groups of smokers.
19 If one, however, who's not really poured over the
20 details of his data sat back and looked at the entire
21 data set, while there are some statistically
22 significant differences across the tar ranges, by and
23 large I would characterize it as nearly complete
24 compensation.

25 Q. And that would be basically the last word out of

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1 R.J. Reynolds on this particular topic; correct?

2 MR. PLESEC: Objection.

3 A. It's the last -- it's the -- not the last, but
4 it is the most recent publication on the issue. I
5 told you that there was an earlier study that reached
6 different conclusions. There was the Robinson and
7 Pritchard survey of the literature, which concluded
8 that compensation does -- can and does occur; it's
9 somewhere in the middle; it's not zero percent
10 compensation certainly; it's not a hundred percent
11 compensation certainly.

12 So we've got three pieces of -- of information
13 that span from no compensation almost to full
14 compensation almost and then a bulk of information in
15 the middle. What's the truth? I believe that --
16 that compensation occurs. I don't believe it's
17 complete. There's no evidence that it's complete. I
18 speak to that from -- from, for example, Robinson and
19 Pritchard's survey of the data. I also speak as a
20 smoker because I don't believe I compensate
21 completely because of the way I smoke and the way I
22 react to changes in products that I smoke.

23 Q. But you would agree with me that your personal
24 experience is certainly not scientific nor
25 necessarily the best evidence because the best

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1 evidence is a scientific study in which you would
2 measure actually plasma nicotine levels; correct?

3 A. No dis --

4 MR. PLESEC: Objection.

5 A. No disagreement that the best way to approach
6 this question is through science, no argument there.
7 What I believe from Byrd's study and probably from
8 some -- the -- the large variability that's in the
9 results in the literature suggests that it's a very
10 difficult experiment to carry out and to get highly
11 consistent results. I think more work needs to be
12 done because we need to -- to delve into this
13 further.

14 But there -- it is a difficult experiment to
15 do. I know we have problems getting accurate
16 compliance among subjects who are -- who are signed
17 up for studies like this. I know that there's --
18 there's difficult -- I mean, it's an extremely
19 difficult thing to do, to collect urine all day long
20 in a special -- in a -- in a prescribed way and then
21 stick to a very careful diet in a very prescribed
22 way. These are difficult experiments to get normal
23 smokers to do.

24 Q. And again, the exhibit I've shown you,
25 Plaintiffs' Exhibit 1111, this would be another

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1 survey of the research and the literature that would
2 indicate that smoking compensation does occur;
3 correct?

4 MR. PLESEC: Objection.

5 A. The information in here, particularly I guess
6 I -- I always put more weight on what I see
7 referenced. Professor -- Professor Russell's --
8 summary of Professor Russell's work and possibly
9 Teeuwen, whoever that is -- I don't know -- is
10 consistent with compensation.

11 MR. O'FALLON: Why don't we quit for the
12 day, and we'll see you tomorrow morning at 8:30.

13 MR. PLESEC: Okay.

14 THE REPORTER: Off the record, please.
15 (Deposition recessed at 5:29 o'clock
16 p.m.)

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1 C E R T I F I C A T E

2 I, William C. LaBorde, hereby certify that
3 I am qualified as a verbatim shorthand reporter; that
4 I took in stenographic shorthand the testimony of
5 DAVID TOWNSEND at the time and place aforesaid; and
6 that the foregoing transcript consisting of pages 1
7 through 346, Volume I, is a true and correct, full
8 and complete transcription of said shorthand notes,
9 to the best of my ability.

10 Dated at Minneapolis, Minnesota, this 2nd
11 day of October 1997.

12

13

14

15 WILLIAM C. LaBORDE

16 Registered Professional Reporter

17 Notary Public

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1 CERTIFICATE

2 I, DAVID TOWNSEND, the deponent, hereby
3 certify that I have read the foregoing transcript
4 consisting of pages 1 through 346, Volume I, and that
5 said transcript is a true and correct, full and
6 complete transcription of my deposition, except per
7 the attached corrections, if any.

8

9 (Please check one.)

10

13

14 _____ No changes were made.

15

16

17 DAVID TOWNSEND

18 Deponent

19

20 Sworn and subscribed to before me this day

21 of 199__.

22

23

24 Notary Public

25 My commission expires: (WCL)

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